



BANCA D'ITALIA  
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# Fiscal Policy: Lessons from the Crisis

Seminari e convegni  
Workshops and Conferences

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BANCA D'ITALIA  
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# Fiscal Policy: Lessons from the Crisis

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Seminari e convegni  
Workshops and Conferences

PUBLIC FINANCE WORKSHOP

Papers presented at the Banca d'Italia workshop  
held in Perugia, 25-27 March, 2010

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## FOREWORD

*Daniele Franco*\*

This volume brings together the papers presented at the 12<sup>th</sup> Banca d'Italia Public Finance Workshop, held in Perugia from 25 to 27 March 2010.

To counteract the 2008-09 recession, the most severe at global level since the Great Depression, governments took unprecedented action. Discretionary measures were approved in many countries to complement automatic stabilisers. International fiscal coordination was enhanced. In some countries, rules and procedures were altered to create more room for budgetary manoeuvre. Growing fiscal imbalances and rising debt levels gradually shifted the focus of debate to the policies for regaining control of public finances. Structural reforms became more prominent on the agenda in many countries in order to reinforce exit strategies.

The workshop focused on the implications of these developments for fiscal policy analysis. The lessons to be learned concerning the role and size of automatic stabilisers, the need for discretionary action and the timing and composition of fiscal policies were investigated. The effectiveness of the fiscal packages was evaluated and the indications to be drawn concerning the composition of discretionary measures were explored. The impact of the crisis on fiscal rules and procedures was also examined together with the extent to which national rules and the revised European Stability and Growth Pact coped with fiscal stress. Finally, the repercussions of the crisis on fiscal sustainability and the need for structural reforms were assessed.

Banca d'Italia is grateful to the institutions that contributed to the success of the initiative, to the experts who provided research papers and to all who came to Perugia to take part in the discussion.

This volume extends the analysis of fiscal policy issues carried out in the previous workshops, which were devoted to *Indicators of Structural Budget Balances* (1998), *Fiscal Sustainability* (2000), *Fiscal Rules* (2001), *The Impact of Fiscal Policy* (2002), *Tax Policy* (2003), *Public Debt* (2004), *Public Expenditure* (2005), *Fiscal Indicators* (2006), *Fiscal Policy: Current Issues and Challenges* (2007), *Fiscal Sustainability: Analytical Developments and Emerging Policy Issues* (2008) and *Pension Reform, Fiscal Policy and Economic Performance* (2009).

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## INTRODUCTION

*Marika Cioffi,<sup>\*</sup> Daniele Franco<sup>\*</sup> and Maria Rosaria Marino<sup>\*</sup>*

The economic downturn and its severe impact on public finances and long-term growth prospects have rekindled the debate on the role, design and priorities of fiscal policy. The limited effectiveness of monetary policy when interest rates are very low, together with the added challenge of dysfunctional credit markets, gave rise to a renewed consensus on the complementarity of monetary and fiscal policies. The role of fiscal policy in stabilising the economy and providing stimulus for a prompt recovery was largely recognised.

As the consequences of the crisis became more and more dramatic, policymakers began inquiring whether the role of fiscal policy for stabilisation purposes should differentiate between ordinary and extraordinary times. In particular, the adequacy of automatic stabilisation under exceptional circumstances was questioned. In fact, while the timely and temporary “free play” of the automatic stabilisers is commonly considered sufficient to ensure fiscal stabilisation during ordinary times, their scope has been found to be too narrow when there is a severe recession.

Despite initial reluctance, the risk of economies being locked into a state of depression paved the way in many countries for exceptional resort to discretionary fiscal stimuli. Crisis-related discretionary stimulus measures in the G-20 countries averaged about 2 per cent of GDP in both 2009 and 2010. The design of stimulus packages varied significantly in size, depending on macroeconomic conditions and priorities. While the United States swiftly approved massive increases in government expenditure, European governments adopted comparatively prudent measures, relying on the working of larger automatic stabilisers. The composition of stimulus packages was also highly heterogeneous.

The overall budget deficit of the advanced G-20 economies increased from about 1 per cent of GDP in 2007 to 9 per cent in 2009. Structural budgetary positions, in some cases already relatively weak on the eve of the crisis, grew substantially worse in many countries. This, and the rapid build-up of public debt in many countries, constrained the further use of fiscal policy to support the economy and made prompt fiscal consolidation a necessity.

The policy debate rapidly shifted to the timing, pace and procedure for withdrawing extraordinary measures, seeking to balance concerns about fiscal sustainability and consolidation with the need to avoid an overly rapid phase-out of fiscal support. In the aftermath of the crisis, it became evident that the pace of financial consolidation and the optimal debt-reduction path are highly dependent on government credibility: if markets are not completely confident in the government’s solvency, the high risk premia paid on public debt provide the rationale for a programme of rapid debt reduction, in contrast with the theoretical prescription of optimal tax smoothing and debt stabilisation.

The reform of fiscal frameworks gained momentum. A strengthening of national fiscal institutions, in the three dimensions of evaluation, planning and implementation, was recognised as crucial to consolidation. The need for rules requiring budget surpluses during cyclical upturns and the maintenance of prudent levels of public debt became even more evident. Medium-term frameworks were deemed essential to ensure the sustainability of public finance. The debate focused on expenditure rules and the role of independent fiscal councils. In the European framework, a consensus emerged on strengthening the Stability and Growth Pact and introducing additional provisions for addressing macroeconomic imbalances.

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Fiscal developments during and after the crisis pose several challenges to fiscal policy analysis. Were automatic stabilisers adequate? Which discretionary actions were more effective? What is the additional evidence about the size of multipliers? Was international cooperation adequate? Which fiscal frameworks proved more effective? How should fiscal priorities and tools be modified to cope with the consequences of the crisis? In the euro area there is both a national and a European dimension.

The papers presented at the workshop were organised in four sessions, mirrored by the sections of this volume. Section 1 examines the lessons of the crisis for the role of automatic stabilisers and discretionary fiscal policy. Section 2 investigates the effects of policy actions on the economy. Section 3 considers the impact of the crisis on fiscal policy rules and procedures. Section 4 deals with the legacy of the crisis and the policy actions required in the coming years.

## **1 Automatic stabilisers and discretionary fiscal policy**

Session 1 contains papers dealing with the role of automatic stabilisers and discretionary fiscal policies during the crisis. The first paper focuses on the discretionary measures introduced by EU member states. The second examines the differences in the effectiveness of policy measures in recessions as opposed to normal times. The third paper discusses fiscal policies before, during and after the crisis. The last four papers present empirical exercises evaluating the effects of automatic stabilisers and discretionary measures in different countries using different methodologies.

The paper by Fischer and Justo deals with the discretionary measures introduced by EU member states in response to the crisis. It provides a broad overview of the types of crisis-related measures taken and an estimate of their size. On the aggregate level, it appears that the discretionary support was timely, temporary and targeted, and that the countries with limited fiscal room did generally take a more restrictive stance than those with more room for manoeuvre. The paper also looks at how discretionary measures complemented automatic stabilisers. Fischer and Justo find that about half of the discretionary measures involved areas already covered by automatic stabilisers, while the other half supported especially hard-hit industrial sectors and population groups as well as public investment. The overall outcome suggests that it was helpful to have *ex ante* principles for the provision of discretionary stimuli. The actual provision of discretionary stimuli under such conditionalities reinforced the budgetary stabilisation capability in a flexible way.

Bouthevillain and Dufrénot use a transition probability Markov switching model to argue that the impact of changes in budgetary variables on real GDP, investment, consumption and employment varies in sign and magnitude in times of crisis and non-crisis. The analysis shows that fiscal variables have an asymmetric effect on these macroeconomic variables. These nonlinearities are both frequent and significant. In particular, if one considers the GDP aggregate, public expenditure has a stronger impact during crises and the expenditure multiplier is greater than the tax multiplier. The consequence is that, during periods of crisis, an expenditure-oriented stimulus plan can be more effective than a tax-based recovery plan. Tax-oriented measures are effective only when private investment and employment are at stake. If households are sensitive to the unemployment situation, tax cuts will not bring about an increase in consumption; larger transfers would be much more effective.

Schuknecht discusses activist fiscal policies during good times, the crisis period and the post-crisis period. First, during the boom, fiscal policies were overly imprudent, due in part to real-time measurement problems. Then, during the bust, the analysis of the roots of the crisis should have gone deeper, avoiding the excessive emphasis placed on the need for activist fiscal demand support. Although the balance sheet nature of the crisis was largely unacknowledged,

significant fiscal measures to support balance sheets were introduced. Scant attention was paid to the fiscal consequences of facilitating the restructuring of economic sectors and the downward adjustment of aggregate demand that had reached unsustainable dimensions during the boom. The author recognises that fiscal exit strategies are being developed and implemented to correct unsustainable fiscal balances. However, policymakers are taking too long to focus on the underlying strategies, as in the case, Schuknecht argues, of expenditure reforms. The paper draws three lessons for activist fiscal policies: i) apply prudent expenditure policies during the boom years and improve the gauging of the fiscal stance; ii) target fiscal policies to the true causes of a crisis; and iii) avoid delay in correcting fiscal imbalances and focus on remedying unsustainable expenditure ratios.

Hamburg *et al.* examine public finance developments in Germany and Italy in 2009 and find that the larger stimulus measures adopted in Germany were associated with a more favourable underlying trend in the German budget balance. Overall, the cyclically-adjusted primary balances deteriorated by a similar extent in the two countries. The automatic stabilisers are estimated to have had an impact of a similar magnitude on the deficit in Germany and in Italy. Given the fiscal conditions in 2008, it is not surprising that the size of the discretionary measures adopted by the two countries were at the opposite extremes of the gamut of reactions of all European governments. Hamburg *et al.* then assess the macroeconomic impact of discretionary measures and automatic stabilisers on the basis of counterfactual simulations with the econometric models of the two countries developed by Deutsche Bundesbank and Banca d'Italia. Altogether, discretionary measures and automatic stabilisers counteracted the fall in real GDP in 2009 by more than 2 percentage points in Germany and by 1 point in Italy. The difference reflects both the size of the stimulus measures and the higher fiscal multipliers in Germany.

Follette and Lutz examine fiscal policy in the United States at both the federal and state and local levels and look at the effects of automatic stabilisers and discretionary fiscal actions in three steps. First, they provide the figures for the effects of the automatic stabilisers on budget outcomes at the federal and then at state and local levels. For the federal government, the deficit increases by about 0.35 per cent of GDP for each 1 percentage point deviation of actual GDP relative to potential GDP. For state and local governments, the deficit increases by about 0.1 per cent of GDP. The authors then examine the response of the economy to these automatic stabilisers by comparing the reaction to aggregate demand shocks with and without them. Second, the paper discusses the effects of discretionary fiscal policy actions at the federal and state and local levels. Federal policy actions are found to be counter-cyclical: expenditures and tax actions are more stimulative after a business cycle peak than before it. By contrast, state and local policy actions are pro-cyclical, probably reflecting constitutional restrictions on general fund budget balances. Lastly, Follette and Lutz evaluate the impact of the budget, through both automatic stabilisers and discretionary measures, on economic activity over the past two years.

The paper by Daude *et al.* measures the cyclical component of fiscal balances using the standardised OECD methodology. At the onset of the international financial crisis of 2008-09, many indicators suggested that Latin American economies were facing it on relatively more solid macroeconomic ground than in the past, both in monetary and fiscal terms. Inflation-targeting regimes made monetary policy more credible; large budget surpluses and low debt-to-GDP levels gave some countries unprecedented fiscal margins to pursue sustainable counter-cyclical fiscal policies. The success of these counter-cyclical responses is still unclear, and will largely depend on the size of the programmes and their actual impact. Besides, in the wake of the international financial crisis, there was no consensus on whether the recent fiscal improvements were cyclical or structural. The paper presents updated original estimates of cyclically-adjusted fiscal balances for eight Latin American countries from the early 1990s to 2009, implementing the standardised

OECD methodology and regional-specific adjustments for the impact of commodity prices. Standard debt sustainability exercises are also performed.

Rezk *et al.* argue that the impact of the world financial crisis on Latin America was buffered by lower external private and public debt exposure and better macroeconomic fundamentals, which reduced the negative effects of turbulences on financial systems. Nevertheless, negative effects soon arose from the external sector. The paper stresses that the main causes of the recent weak economic performance of Argentina lie in domestic economic policies. These policies sometimes amplified the negative impact of the international crisis. Government revenues grew in relation to GDP, though at a decreasing pace. The increase in primary expenditure in 2008 was not due to measures aimed at counteracting the effects of the international financial crisis but rather to decisions to maintain subsidies and freeze the tariffs of public services and utilities, and to generalised increases in capital outlays. The low level that the primary surplus fell to in 2009 originated in expansionary fiscal policies decided in 2007. Although the sensitivity of tax revenue to the economic cycle increased and stabilised at around 30 per cent in 2009, the automatic stabilisation proved insufficient and discretionary measures became necessary.

Brender disagrees with the main point of Bouthevillain and Dufrénot's paper. He argues that one should consider non-linearity in the effectiveness of various policies during recessions (*i.e.*, evaluating whether effectiveness changes when a recession has exceptional features) rather than differences between the performance of policy measures during recessions compared with normal times. Brender recommends extreme caution in moving from theoretical analysis to actual policy prescriptions. He offers several suggestions to improve the specifications of the model so as to avoid results that are driven mainly by the specific features of the model. Turning to the Fischer and Justo paper, Brender recognises the usefulness of the dataset on the policy measures adopted by EU members and agrees with the approach taken in the paper, but objects that the paper provides too little analysis.

Langenus agrees with Schuknecht's analysis but adds some points to the discussion. He contends that as long as one accepts that the current assessment of the cyclical position depends on projected future developments, estimates of structural balances will continue to present some degree of uncertainty. In addition, it is necessary to bear in mind the unreliability of the government accounts of certain countries, a situation that demands reforms both at the national and the European level. Langenus also notes that the crisis provides an ideal opportunity to rethink the design and implementation of the EU fiscal rules. The crisis showed that a much broader assessment of fiscal risks is necessary: greater attention should be paid to public debt developments, implicit liabilities and macroeconomic imbalances. Langenus finds the paper by Hamburg *et al.* offers an excellent empirical assessment of the fiscal reaction to the crisis in Germany and Italy. However, he argues that, by focusing on stimulus measures and automatic stabilisers, the authors neglected the differences in budgetary trends, even though they recognise that these can be important and that the "bottom-up" measurement of fiscal stimulus may give a misleading picture of the actual fiscal policy loosening. Langenus recommends further developing the comparison of government actions in each country with a neutral benchmark. He also suggests working on qualitative issues pertaining chiefly to the third T of the 3T principles, to assess how appropriately "targeted" were the measures.

Larch observes that the papers by Follette and Lutz, Daude *et al.* and Rezk *et al.* illustrate the persistent lack of clarity about just what automatic fiscal stabilisers are and how their effectiveness should be assessed with respect to output smoothing. Follette and Lutz, as well as Rezk *et al.*, take the approach that automatic stabilisation results from changes in revenue and expenditure produced by cyclical swings in economic activity. Alternatively, Daude *et al.* interpret automatic stabilisation as resulting from the inertia of discretionary spending over the cycle, but with some inconsistencies. In particular, when discussing the concept of automatic stabilisation, they refer to



cyclical swings of revenues, but in estimating the size of automatic stabilisers they follow an approach – developed by the OECD – according to which the strength of stabilisation is largely determined by the size of government. This issue becomes important for assessing the effects of automatic stabilisation on output, because it affects the definition of the benchmark against which those effects are to be gauged. When simulating the effect of automatic stabilisers on output, Follette and Lutz and Rezk *et al.* define the neutral budget as one in which revenue and expenditure are invariant with respect to output; Daude *et al.*, by contrast, use a benchmark in which both revenue and expenditure change in line with output. While equally arbitrary from an *ex ante* point of view, the two benchmarks have very different implications when it comes to assessing the extent to which automatic stabilisers help mitigate output fluctuations.

## 2 Fiscal impulse

Session 2 examines the impact of policy actions on the economy. The first four papers look at the links between fiscal policies and the macroeconomic situation and assess and measure the effectiveness of fiscal policies in stabilizing the economy. The fifth paper provides an insight into the spillover effects of the fiscal measures adopted by foreign countries on a small open economy. The last three papers examine how fiscal policy may help lessen or, on the contrary, exacerbate financial turmoil.

Debrun and Kapoor revisit the empirical link between fiscal policy and macroeconomic volatility. Their analysis provides strong support to the view that fiscal stabilisation operates mainly through automatic stabilisers. By contrast, fiscal policies systematically linked to cyclical conditions do not appear to have a significant impact on output volatility, and changes in fiscal variables not systematically related to the business cycle generally seem to increase output and consumption volatility, possibly owing in part to conflicts with monetary authorities. Debrun and Kapoor are aware that the last two results may suffer from a simultaneity bias because certain sources of budgetary volatility are correlated with output volatility; and they observe that even if financial development seems to exert a moderating influence on income and on consumption growth, robustness tests indicate that it may proxy the role of other country-specific features not included in the analysis. Concerning monetary policy, central bank independence is associated with lower volatility, provided that the interaction between monetary and fiscal policies is taken into account. In terms of policy implications, Debrun and Kapoor claim that fiscal policy is unambiguously effective at stabilising the economy when it operates in the same way as automatic stabilisers, and that governments could also contribute to macroeconomic stability by subjecting the pursuit of other objectives, such as redistribution or efficiency, to a “stability test”.

Van Brusselen focuses on fiscal stabilisation providing an overview of the theory and empirical evidence on the effects of fiscal policies implemented in the context of the recent global recession and financial distress. Using the NIME model of the Federal Planning Bureau, he calculates that in the first year of its implementation the European Commission’s Recovery Plan would raise the GDP of twelve euro area countries by 0.77 percentage points with respect to the baseline. The initial effect would be to increase private sector output, creating about 200,000 jobs in response to the rise in public consumption. The ensuing increase in household income would raise private consumption expenditure. The second half of the stimulus package, to affect the economy in 2010, would raise GDP by 0.62 percentage points. This lesser impact is related to higher inflation and real imports and to a slight increase in nominal interest rates. Over the period 2011-15, the effects of the stimulus package on output would decline, with real GDP gradually falling back toward its baseline level. Finally, Van Brusselen addresses the question of where the world economy is headed, given the generally unsustainably high levels of public sector deficits

and debt and the possibility that the global financial crisis will have lasting adverse effects on potential output levels.

In Röger and in't Veld's paper a multi-region DSGE model with collateral-constrained households and residential investment is used to examine the effectiveness of fiscal policy stimulus during a credit crisis. The paper explores alternative scenarios that differ according to the type of budgetary measures, their duration, the degree of monetary accommodation and the level of international coordination. An increase in households facing credit constraints, together with the fact that the zero lower bound on nominal interest rates has become binding, increases the effectiveness of temporary fiscal stimulus measures. In particular, the presence of credit-constrained households raises the marginal propensity to consume out of current net income and makes fiscal policy a more powerful tool for short-run stabilisation; credit-constrained consumers react even more strongly to a fall in real interest rates, which can occur when monetary policy can be accommodative towards the fiscal stimulus. While this suggests a larger role for fiscal policy in the euro area, in many of the member states in central and eastern Europe interest rates were generally higher. As it is less likely that monetary policy in these countries can accommodate the fiscal impulse, their fiscal policy turns out to be less effective than in countries where nominal interest rates can be kept unchanged and real interest rates allowed to fall. However, even when monetary policy cannot accommodate the fiscal impulse, well-designed fiscal stimulus measures can still help to soften the impact of a crisis and mitigate its detrimental effects on potential growth.

Valli Jorge and De Carvalho use an extension of the ECB's New Area-Wide Model (NAWM) to model a fiscal policy that pursues primary balance targets in order to stabilise the debt-to-GDP ratio in an open and heterogeneous economy where firms combine public and private capital to produce their goods. The model has been extended by broadening the scope for fiscal policy implementation and allowing for heterogeneity in labour skills; the domestic economy is assumed to follow a forward-looking Taylor-rule consistent with an inflation-targeting regime. The model is then calibrated for Brazil to analyse some implications of monetary and fiscal policy interaction and explore some of the implications of fiscal policy in this class of DSGE models. Among other interesting results, Valli Jorge and De Carvalho find that an expansionary shock to the primary surplus is not equivalent to a shock to government consumption, as the former impacts both government consumption and investment to a different degree. Each of the fiscal shocks (primary surplus, government investment and government transfers) has a distinct effect on the model dynamics. The paper shows that under different specifications of monetary and fiscal policy rules, fiscal shocks have important effects on the model's dynamic responses and predicted moments. Stronger commitment to stabilisation of the public debt strengthens the contractionary impact of the monetary shock. Strongly (and negatively) correlated policy shocks also dampen the contractionary consequences of the monetary policy shock.

Kaniovski and Schratzenstaller present a macroeconomic simulation of the short-term effects of the fiscal stimulus measures adopted by Austria and by its most important trading partners to cushion the economic downturn. The rationale of their simulation is to assess the effectiveness, in terms of output and employment, of national stabilisation programmes and to evaluate the size of cross-country spillover effects, expected to be quite large for a small, open economy like Austria. Model simulation suggests that the fiscal packages may have dampened the downturn by a cumulated 2.1 per cent of GDP in 2009 and 2010. Almost half of the fiscal impulse is generated by national measures, while the incidence of the spillover, captured by the fiscal stimulus of partners, accounts for one third of the overall estimated effect. In addition, the total impact on GDP secured 41,500 jobs and curbed the rise in the unemployment rate by 0.7 percentage points. The authors conclude that, since some measures have a positive direct impact on employment that cannot be

captured by this kind of model, the simulation results should be taken as the lower bound of the overall employment effect generated by the fiscal stimulus programmes.

Baldacci *et al.* use an ordered logit model to assess the effects of fiscal stimulus packages during episodes of systemic banking crisis in advanced and emerging market countries over the period 1980-2008. Their results show that timely countercyclical fiscal measures can help shorten crises by boosting aggregate demand and offsetting the collapse of private investments. Nevertheless, these outcomes are weaker for countries with limited budgetary room and where fiscal expansion is prevented by funding constraints or limited access to markets. The composition of fiscal responses is important: fiscal expansions based on government consumption and income tax cut are more effective in shortening the recession, while a larger share of public investment yields the strongest impact on output growth. These findings suggest a potential trade off between short-run aggregate demand support and medium-term productivity growth objectives. Two stylised facts emerge: i) the fiscal measures enacted by G-20 countries may have curtailed the crisis by up to one year and ii) they may have stimulated post-crisis growth by 1 per cent of GDP compared with the counterfactual scenario of no fiscal stimulus. Results can be larger for emerging market economies than for advanced countries, since the former devoted a greater share of the stimulus to infrastructure, while the latter made greater resort to tax cuts and transfer increases.

Afonso *et al.* assess the extent to which government spending can mitigate economic downturns in the short run and whether the impact on real GDP growth differs during financial crises and ordinary times. In their panel analysis, conducted for a set of OECD and non-OECD countries over the period 1981-2007, the authors also control for reverse causality, as current economic growth may negatively affect government spending behaviour. Their results show that the increase in real government spending has a positive and significant impact on real GDP growth. The fiscal multipliers for the full sample of ordinary and crisis spending are estimated at 0.6-0.8. However, although the impact of government spending is greater in times of distress, the Wald test suggests that there is no statistically significant difference between spending in crisis and in ordinary times. This significant result, indicating that government spending has essentially the same impact on economic growth during ordinary times and during financial downturns, holds throughout the sample, using a diversity of controls, sub-samples and specifications.

Focusing on Australia, McDonald and Johnson analyse how tax systems may have increased economies' vulnerability to financial shocks. In particular, tax systems have a bias towards corporate debt financing over equity, thus contributing to excessive leverage; the tax preference for housing may have prompted housing booms, although its contribution to financial instability is unproven; in addition, concessional tax treatment of capital gains is likely to have distorted asset allocation and to have encouraged investment in riskier assets. Some recent tax proposals, such as a Tobin tax or other taxes and levies on the financial sector, could augment the vulnerability of the financial sector. As an alternative, the authors identify a number of policy reforms aimed at correcting tax-policy-induced risk misallocation rather than concentrating on financial sector taxes. Among these, an allowance for corporate equity would reduce corporate debt biases, a flat tax rate on capital income would diminish tax arbitrage across classes of assets, and improved loss offset provisions would act as microeconomic stabilisers.

Lindh stresses that more caution than ever is required today in estimating automatic stabilisers and fiscal multipliers. It is likely that the current deep crisis will change some economic relationships even after new equilibrium paths have emerged. Referring to Debrun and Kapoor's paper, he suggests that it would be interesting to introduce some examples of fiscal activism not related to the cycle. He argues that the finding that monetary policy frameworks are stabilising depends in part on the data used and that the result could change if post-crisis data were included. Lindh also stresses that, at least in normal times, it would be important for fiscal policy to pave the way for monetary policy by remaining prudent, and agrees with Debrun and Kapoor that the

practical way to ensure this is to subject the budget to quantitative objectives or binding constraints defined in terms of structural balance or expenditure ceilings. Concerning the paper by Van Brusselen, Lindh concentrates on the role that fiscal policies can play in stimulating demand during deep crises. He observes that many stimulus packages include permanent measures and that it would be interesting to assess whether such measures increase growth rates in the upturn after the crisis. Lindh agrees with Van Brusselen that fiscal stimulus, to be effective, requires measures tailored to individual countries and keyed to specific conditions such as the degree of openness of the economy and the initial conditions of the government accounts. Nevertheless, Lindh stresses that policy coordination among countries can also play an important role.

Before commenting on the papers by Kaniovski and Schratzenstaller, Valli Jorge and De Carvalho, and Röger and in't Veld, Monacelli depicts the current state of the debate on the effectiveness of fiscal stimulus packages, on the size of fiscal multipliers and, more generally, on the forecasting power of macroeconomic models and their reliability as potential policy guides. More specifically, Monacelli describes Kaniovski and Schratzenstaller's paper as a typical example of macro model simulation; she appreciates the wealth of details on the Austrian economy and the analysis of spillover effects. She suggests providing a more detailed description of the functioning of the macroeconomic model, the channels through which the spillover works and the impact of the crisis on fiscal policy effectiveness.

Countryman comments on the papers by Baldacci *et al.*, Afonso *et al.* and by MacDonald and Johnson. He remarks that the three papers make valuable contributions to the debate on fiscal policy: the first two papers focus on how fiscal policy can mitigate the effects of the economic turmoil, while the third adopts a somewhat different perspective, examining how tax policies may have made the recent financial crisis deeper and longer. Countryman suggests that an interesting extension of the work by Baldacci *et al.* would be to evaluate the effects of fiscal measures on long-term fiscal sustainability; in this context, time-limited spending could be more flexible than tax cuts, which tend to be more permanent. Concerning the findings of Afonso *et al.*, he observes that there is no evidence that fiscal policy is more effective during a financial crisis than in "ordinary times". He argues that this result may be biased because the authors do not control for the monetary policy stance at the time of crisis. Finally, Countryman describes MacDonald and Johnson's paper as a very good overview of how microeconomic policy instruments, such as taxes, can have profound macroeconomic effects.

### 3 Fiscal policy and fiscal rules

The papers in Section 3 discuss the impact of the crisis on fiscal rules and procedures. The first three papers examine fiscal policy developments and the debate on national fiscal frameworks, respectively, in the area of Eastern and Central Europe and Central Asia, in Colombia and in New Zealand. The next two papers focus on the euro area. The last two papers are devoted respectively to the issue of fiscal consolidation, with an emphasis on periods of financial crisis, and the impact of the crisis on sub-national public finances.

Barbone *et al.* present an overview of the fiscal reforms enacted by the countries of Eastern and Central Europe and Central Asia (ECA) during the last two decades, with a focus on Poland, Russia and Turkey. In particular, most of the ECA countries adopted binding budgetary rules in order to reduce institutional fragmentation, enhance transparency and promote fiscally responsible behaviour. During the 1990s these countries were determined to accelerate the transition from the central-planning system. In a favourable external environment, they strengthened their fiscal institutions and improved their fiscal outcomes. This positive trend reversed when the global financial crisis struck and some reforms proved too inflexible for a period of economic downturn.

In the short term, the ECA countries reacted with measures to contain the deficit, boost aggregate demand or protect certain segments of the population. Later, once the crisis revealed the risks that volatile environments pose for long-term stability, the need for further institutional, social and fiscal reforms became paramount.

The contribution of Lozano is twofold. First, he offers an empirical characterisation of the fiscal policy in place in Colombia over the last decades. Estimating a standard fiscal reaction function, the author provides evidence of the pro-cyclicality of Colombian discretionary fiscal policy, its recently decreasing volatility and its long-term (weak) sustainability. This last result is confirmed by a cointegration test between taxes and spending. Second, Lozano evaluates the fiscal stance during the financial crisis of 2008. With little room to manoeuvre, Colombia's fiscal authorities adopted a rather neutral posture during the crisis, resulting in a deterioration of fiscal indicators, with a drop in tax revenue and a rise in public debt and the budget deficit. Lozano contends that the adoption of binding fiscal rules may strengthen policy credibility, thus hastening economic recovery and ensuring fiscal discipline in the long term. To be effective, these rules should include more than just numerical targets for the coming years: they should guarantee a decreasing trend for the debt-to-GDP ratio and allow for counter-cyclical fiscal policies in order to smooth out the business cycle.

Mears *et al.* present an overview of the fiscal framework in place in New Zealand and country's economic performance during the last two decades. The present fiscal policy framework, mainly designed by the Public Finance Act of 1989, is focused on maintaining prudent levels of public debt (as a precautionary buffer) and on running fiscal surpluses on average over time, while providing no specific indication for government spending. The existing fiscal institutions, along with the economic expansion enjoyed by the country since the late 1990s, contributed to New Zealand's entering the financial crisis of 2008 with a low level of public debt, but with an unprecedented level of government spending (as a per cent of GDP). In order to strengthen the government fiscal strategy, the authors propose the introduction of a spending cap, designed as a rolling three-year nominal target for operating expenses and excluding capital spending, unemployment benefits (cyclical and part of automatic stabilisers) and interest payments (which are beyond the government's control). This spending cap would narrow the scope for new discretionary spending, while allowing a margin to accommodate unexpected changes in forecast expenses. Nevertheless, the risks implied by the proposal, mainly in terms of reduced flexibility to deal with shocks, motivated the government decision not to introduce a formal cap.

Burriel *et al.* evaluate the impact of fiscal policy shocks – mainly on GDP and inflation – in the euro area. To this end, they implement a standard linear structural VAR model (as in Blanchard and Perotti, 2002) using a newly-available quarterly dataset of fiscal variables over the period 1981-2007. They also compare their results with the findings of previous exercises conducted for the United States. Government spending shocks are found to yield positive GDP responses during the first five quarters in both the euro area and the USA; output multipliers are below one (thus indicating sizeable crowding-out effects) and become insignificant after 3 years from the shock. Symmetrically, net tax increases have a negative impact on output, inflation and long-term interest rates. An interesting finding is that government spending multipliers increased in the sub-period beginning in 2001, presumably owing to the “global saving glut”, which reduced the crowding-out effects of fiscal policy on private investment. In line with the evidence of previous literature, short-term tax multipliers are of a lower magnitude and less persistent (only three quarters following the shock) than government spending ones. This is also consistent with the theoretical prediction that a portion of the increase in disposable income deriving from tax cuts will be saved.

Creel and Saraceno join the debate on the effectiveness of the Stability and Growth Pact, which mainly relies on automatic stabilisers as counter-cyclical instruments to ensure shock resilience and income stability. They marshal several arguments to show that the effectiveness of

automatic stabilisers has diminished enormously: the sensitivity of economic activity to cyclical changes in government revenues and spending has waned; the responsiveness of unemployment benefits to the unemployment rate has decreased, as has tax progressivity; similarly, the size of government has been reduced almost everywhere in Europe. In addition, they employ a simple micro-founded model to show that, in the current setting of strong liquidity constraints, the scope for non-Keynesian effects of an expansionary fiscal policy is greatly reduced. Finally, they use the arguments above and the findings of a recent strand of literature (starting with Blanchard and Perotti, 2002) to challenge the current setting of the EMU institutional framework and to advocate a reform of the Stability and Growth Pact in the direction of a greater use of discretionary fiscal measures as valuable tools for stabilisation.

Barrios, Langedijk and Pench analyse past episodes of public debt expansion to provide relevant policy indications, exploiting features in common with the recent global crisis. They use a panel of OECD countries over the period 1970-2008 to investigate the determinants of successful consolidation strategies (in terms of debt reduction). The main innovation of the paper is the assumption that the causes of fiscal consolidation are also likely to influence its success rate. Under this assumption, the authors use a two-step Heckman probit estimator, which allows them to control for sample selection bias, mainly in terms of starting debt level, which is likely to affect both the decision to consolidate (a high-debt country is more likely to consolidate) and the success of the consolidation. Their two-step strategy shows that the overall effect of the starting debt level on the probability of successful consolidation is positive but lower compared with the ordinary one-step results, suggesting that the estimate is upward biased when one does not control for the correlation between the decision to consolidate and the likelihood of achieving a successful consolidation. Another interesting finding is that consolidations undertaken during financial crises and even in their aftermath are less likely to succeed, thus implying that restoring the financial sector is a pre-condition for success. Ultimately, there is no evidence that a fiscal consolidation would be facilitated by exchange rate manipulation to promote an export-led recovery.

Fedelino and Ter-Minassian assess the impact of the crisis on sub-national government (SNG) finances. The crisis hit sub-national budgets both directly (e.g., via the decline in own revenues and upward pressure on cyclically-sensitive spending programmes) and through the involvement of SNGs in the implementation of the national fiscal stimulus packages. Against these developments, central governments increased general-purpose and (prevalently) earmarked transfers; their support also took the form of a temporary relaxation of fiscal rules and borrowing constraints or a direct provision of loans. Thanks to the increased support and by using their own available “fiscal space”, some SNGs could enact counter-cyclical responses. This proved insufficient: most of them had to resort to pro-cyclical revenue increases or expenditure cuts. The authors conclude by challenging the traditional view that excludes any role of SNGs in fiscal stabilisation. Consistently with the ongoing decentralisation of spending, desirable arrangements should allow sub-national counter-cyclical policies, while laying down sub-national fiscal rules to ensure the build-up of adequate reserves and reduce the risk of pro-cyclicality. Moreover, the introduction of institutional mechanisms for coordination across government levels should minimise adverse inter-jurisdictional spillover effects and improve the credibility of the overall fiscal strategy.

Heald begins his discussion of the first three papers by posing some preliminary questions about the role of fiscal policy and the most efficient way to manage “abnormal events” and large public debt contingencies. He goes on to urge Barbone *et al.* to give clear answers to the three research questions they pose and to carefully consider the potential gap between the formal design of institutions and their actual performance. In reviewing Burriel *et al.*, Heald acknowledges the contribution of the paper, extremely clear and informative in the strand of the emerging literature. However, he suggests that the authors provide a sound justification for the comparability, in terms

of fiscal policy impact, between the United States and the euro zone, given their entirely different constitutional and fiscal framework. He also raises two data-related caveats. Finally, commenting on Lozano, Heald recommends caution in calculating the output gap and advises the author to complement the focus on fiscal rules with arguments for transparency of government measures.

Kastrop comments on the papers by Creel and Saraceno and by Barrios, Langedijk and Pench. He challenges the empirical evidence, found in the first paper, that the effectiveness of automatic stabilisers and of a rule-based fiscal policy is undermined when the conditions of the Ricardian equivalence (such as the assumption of rational expectations) are not met. Kastrop agrees with Barrios *et al.* that the success of a national fiscal consolidation depends on the contingent economic conditions of each country (e.g., debt level and banking system), but he disputes the evidence that an export-led growth strategy has no impact on consolidation and potential growth. Kastrop advocates a reformed Stability and Growth Pact relying on a rule-based approach as an instrument to promote fiscal consolidation in the short run and to boost growth in the long run. By contrast, discretionary fiscal measures could turn out to be pro-cyclical if their timing is not appropriate. Finally, he calls for the introduction of a debt restructuring mechanism to tackle sovereign solvency problems and to complement the Stability and Growth Pact in the EU framework.

Kremer observes that the last two papers, by Mears *et al.* and by Fedelino and Ter-Minassian, shed some light on the debate about the suitability of fiscal institutions to cope with financial stability challenges with and without financial crises. Commenting on the first paper, Kremer points out some general pitfalls of spending rules (e.g., unclear targets, increasing expenditure ratio not reflecting a spending bias) and suggests two alternative definitions of the cap, both taking these pitfalls into account. Her recommendation is to define the cap in terms of cyclically-adjusted expenditure or, alternatively, to consider capping fiscal loosening after unexpectedly favourable periods in terms of cyclically-adjusted tax revenues. Finally, Kremer agrees with Fedelino and Ter-Minassian on the necessity of a better alignment of fiscal rules across different levels of government, but she asserts that fiscal stabilisation is less error-prone if orchestrated at the national level. She also stresses the importance of the distinction between rules for ordinary times and exemptions for extraordinary events (e.g., financial crises); in particular, she calls for a more careful definition of the exemption clauses to prevent overly-broad exemptions from undermining fiscal policy consistency in ordinary times.

#### **4 The legacy of the crisis and the exit strategy**

Session 4 examines the legacy of the crisis and the policy actions required in the coming years. The first paper deals with the effects of the banking crises. The next two are country studies highlighting the different impact of the crisis in developed countries and emerging market economies. Two papers consider the case of Japan, where the current recession is exacerbated by pre-existing problems. The last three papers examine, respectively, the theoretical case for debt reduction after the crisis, the design of an optimal fiscal rule and the implications of the EU medium-term targets.

Furceri and Zdzienicka assess the consequences of banking crises for public debt. They note that direct bailout costs are only a part of the fiscal cost associated with banking crises. The fiscal consequences also include the reduction in revenue due to output losses and the increase in expenditure due to automatic stabilisers and discretionary policies. On the basis of a panel of 154 countries from 1980 to 2006, the authors show that banking crises are associated with significant and long-lasting increases in debt-to-GDP ratios. Where there were severe output losses, banking crises were, on average, followed by a medium-term increase of about 37percentage points in the

gross debt-to-GDP ratio. The increase in debt ratios is greater in countries with relatively bad initial fiscal positions and with a high share of foreign public debt. The authors conclude that, given the severity of the current financial crisis and the associated fiscal policy response, countries should take measures to avoid putting fiscal sustainability at risk.

Reiss and Köhler-Töglhofer evaluate the implications of the economic crisis of 2008-09 for fiscal policy in Austria. They show that the recession and the impending demographic changes would cause the public finances to deteriorate significantly and permanently in the absence of consolidation. The overall consolidation effort in the medium term would be close to 4 per cent of GDP. The authors stress the need to: i) implement credible consolidation programmes in order to secure public confidence in the sustainability of the public finances as soon as possible, ii) cope with population ageing; and iii) build up margins for automatic stabilisers and discretionary measures in view of possible future crises. They emphasise that consolidation should rely mostly on spending cuts. In this regard, they point to the potential role of the medium-term expenditure framework introduced by the 2007 Federal Budget Reform. These measures should be supported by structural reforms to raise potential output. In particular, it would be important to raise employment rates; neither higher temporary inflation nor personal income tax increases are a useful option.

Vieira Levy examines the factors underlying the relatively brief and mild impact of the 2008 financial crisis on the Brazilian economy. He reviews the reforms undertaken since the mid-1990s and the economic situation of Brazil before the crisis. In the late 1990s Brazil introduced a new macroeconomic framework based on a flexible exchange rate, inflation targeting and fiscal responsibility. The commitment to fiscal discipline was formalised in the Fiscal Responsibility Law enacted in 2000. The law, applicable to all levels of government, sets constraints on the financing of the public sector, including state-controlled financial institutions, and provides for budgetary planning and disclosure rules. Fiscal targets were met every year up to 2009, with most of the fiscal adjustment falling on tax increases. The paper also examines the government's response to the crisis, which involved protection of financial markets and support to credit, full operation of automatic stabilisers and fiscal stimulus. Vieira Levy argues that Brazil's success in withstanding the crisis reflects the policies implemented since the mid-1990s. He also points to the risks ahead and notes that priority should be given to fiscal responsibility. Medium-term fiscal spending targets, together with further structural reforms, can reduce aggregate risks, bring down interest rates and help the private sector to grow with less support from government.

Saito examines the budgetary problems of Japan and points to the persistent mismatch between expenditure and revenue and to the difficulties in achieving consolidation targets. He notes that the tax system has not produced sufficient revenues. This reflects repeated tax reductions motivated by the need to stimulate the economy and to improve the competitiveness of Japanese companies. Saito argues that room for expenditure cuts seems rather limited while the relatively low tax burden suggests there is significant scope to increase revenue. He notes that interest expenditure is currently relatively small but could increase when economic growth and private investment pick up.

Ueda, Ishikawa and Tsutsui point to the difficulty of assessing fiscal sustainability when revenues fluctuate sharply and unexpectedly. They note that in recent years tax revenues in Japan have been considerably unstable, so it is no longer appropriate to calculate the amount of structural tax revenue using a standard elasticity. The paper examines the fluctuation of Japan's corporate tax revenue and its elasticity since 1980. In particular, it evaluates the role of structural and cyclical changes in the distribution of value-added, the relationship between interest rates and return on capital, asset price movements and return from foreign investment, the divergence of economic fluctuations among sectors and the deductions of carried-over losses. Finally, the paper discusses appropriate methods for the estimation of structural corporate tax revenue.



Caprioli, Rizza and Tommasino investigate the optimal path of debt reduction in the period following the crisis. Using a DSGE model, they inspect the inconsistencies between the policy advice offered by international institutions, recommending rapid debt reduction, and the indications of optimal fiscal policy literature, usually calling for debt stabilisation. After briefly reviewing the theory of optimal fiscal policy, the authors show that when agents have full confidence in government solvency there is no need to reduce the initial debt ratio. On the contrary, when agents are concerned about government default, a post-crisis fiscal consolidation is optimal because the risk premium demanded would make the interest rate on government debt too high. The cost of higher distortionary taxes during a period of fiscal consolidation is more than offset by the expected benefits of lower distortionary taxes in the following period. The optimal size of consolidation is a function of the degree of government credibility and of the post-crisis level of debt.

Yörükoğlu develops a dynamic fiscal model in order to delineate optimal fiscal rules for Turkey. Given the expectations about the future income trend, the optimal path of public expenditure and debt minimises a measure of the total sum of deviations from the ideal debt-to-output ratio and the desired smooth government expenditure path. Fiscal rules can help by easing the time-inconsistency problem, allowing government to borrow in bad times without paying high risk premia. To work as a successful commitment device, a fiscal rule must be simple, transparent and credible. The model is calibrated using Turkish data. Different coefficients and rules are tested. The author shows that the fiscal rule considered is successful, but an optimised linear rule would significantly reduce the volatility of government expenditure. An optimised non-linear rule would improve the performance further, significantly reducing the volatility of government expenditure and debt. The optimal parameter values for the linear and non-linear rules do not depend on the value of the political preference parameter.

Biraschi, Cacciotti, Iacovoni and Pradelli analyse the medium-term objectives (MTOs) adopted by the EU member states as a reference for the multilateral budgetary surveillance, assessing their ability to promote long-term fiscal sustainability. Using a calibrated algorithm that closely follows the formulation on which member states agreed upon (but which has not been disclosed), the paper evaluates two novel features of the algorithm for computing the minimum budgetary targets that EU countries can declare MTOs: i) an extra debt-reduction effort requested from high-debt countries, and ii) the partial frontloading of the expected future increases in age-related expenditure. The paper also evaluates the impact of the crisis on MTOs through higher public debt, lower growth potential and higher costs of ageing. It concludes that prospective MTOs would be more stringent than current ones. Therefore, a path for gradual fiscal tightening is already embedded in the European fiscal framework and should be considered when discussing exit strategies. Finally, the paper sketches a simple alternative method, introducing into the MTO determination new elements related to the growth of external and domestic imbalances, such as the composition of public debt by maturity and the structure of private sector debt.

Cottarelli agrees with the main points of the papers by Furceri and Zdzienicka and by Saito. He concurs with Furceri and Zdzienicka that banking crises have major implications for the fiscal accounts and that these implications depend on the specific features of the crises. He notes that the paper omits an important aspect – the potential interaction between banking crises and exchange rate. Cottarelli presents data in which the increase in general government gross debt in the advanced G-20 countries is broken down into its various components. He concludes that a large part of the shock to public debt is permanent and will require significant consolidation measures.

Hemming discusses the papers by Biraschi, Cacciotti, Iacovoni and Pradelli and by Reiss and Köhler-Töglhofer. He agrees with Biraschi *et al.* that the risk created by a particular debt level depends on a host of factors that varies across countries and that it would be better to take some of these into account when computing MTOs and the supplementary debt-reduction effort that a

country should make. He suggests that the authors take into account the work that has been done on emerging markets with the specific objective of determining their specific debt tolerance. Hemming welcomes the emphasis that Reiss and Köhler-Töglhofer place on growth-oriented adjustment and expenditure-based fiscal consolidation, regretting, however, the dearth of information about the specific expenditure cuts they advocate. He also agrees with their tax policy indications, but stresses that the reduction of marginal tax rates on labour should be given priority.

Jędrzejowicz comments on the papers by Caprioli, Rizza and Tommasino and by Yörükoğlu. He notes that both address the issue of the optimal debt ratio using a theoretical model. He advises Caprioli *et al.* to better model the possibility of default and to consider the level at which the ratio should be reduced when agents fear a possible default. He also notes that stabilising debt ratios at the post-crisis level, in the presence of full trust in government solvency, would lead to ever higher debt ratios after each successive crisis or downturn. Jędrzejowicz then addresses the dual objective of the rule proposed by Yörükoğlu. He remarks that maintaining a stable ratio of public expenditure to nominal GDP would result in pro-cyclical policy. An alternative option would be to target a stable ratio of spending to potential GDP, provided that the underlying fiscal position is sound. Maintaining a stable debt ratio can be problematic since fluctuations of the ratio over the cycle are the natural consequence of the operation of automatic stabilisers. If a government were to try to minimise these fluctuations, this would again imply a pro-cyclical policy. He concludes that the paper should take the cyclical impact of fiscal policy into account when discussing the design of an optimal fiscal rule.

## **Session 1**

### **AUTOMATIC STABILISERS AND DISCRETIONARY FISCAL POLICY**



# GOVERNMENT FISCAL AND REAL ECONOMY RESPONSES TO THE CRISES: AUTOMATIC STABILISERS VERSUS AUTOMATIC STABILISATION

*Jonas Fischer\* and Isabelle Justo\**

*This paper looks at the discretionary fiscal and real economy support measures introduced by EMU Member States in response to the crises. The analyses build on a data base assembled by the Commission on individual crises response measures with a view to survey the implementation of the European Economic Recovery Programme (EERP). The paper first provides a broad overview of the types of crises-related measures taken, including broad estimates of their budgetary dimension. On this basis it appears that on an aggregate level, the discretionary support has been in line with agreed principles of being timely, temporary and targeted. Member States with restricted fiscal space has overall taken a more restrictive stance than those with more room of manoeuvre. The paper then looks at how these discretionary measures complement the “automatic” budget stabilisation. It appears that, in budgetary terms, about half of the discretionary measures add to the areas already covered by automatic stabilisers while the other half address other areas such as investments, industrial sectors and vulnerable groups particularly hit by the crises. The overall experience may suggest that it has been helpful with agreed ex ante principles for how discretionary stimuli should be provided and that the provision of discretionary stimulus under such conditionality can work to strengthen the budgetary stabilisation capacity in a flexible way.*

## 1 Introduction

The economic crises have provoked substantive policy responses, in the EU and globally. The role of discretionary fiscal stimulus as an ingredient in a successful policy response was initially vividly debated and the stance among EU policy makers was arguably relatively cautious. The cautiousness was rooted in a consensus, built-up over many years and backed up by historical evidence,<sup>1</sup> that discretionary fiscal stimulus suffers from problems related to the design, implementation and reversibility of measures. Therefore, in normal circumstances the fiscal stabilisation job should be restrained to the “free play” of the automatic stabilisers as they are relatively well targeted and by nature also timely and temporary. Moreover, it has been argued that in the EU/euro area the size of government is relatively large implying that also automatic stabilisers are sufficiently large.<sup>2</sup>

Nevertheless, as the depth of the crises manifested itself with more strength, and as stimulus through monetary policy appeared partially impaired, the worries of entering into an outright depression led to a change of hearts. Despite quickly deteriorating fiscal positions, the concern about using discretionary fiscal policy for stabilisation purposes were overridden by the greater concern about economic developments and the risk of economies being locked into a state of depression. Policy makers in the EU/euro area thus opened up to the idea that it would be appropriate with additional fiscal stimuli given that this was not a normal downturn. Discretionary fiscal stimulus was seen as an insurance policy, both from an economic perspective, to reduce the risk of a depression, and possibly also from a political economy perspective to get acceptance from

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The views expressed in the paper are those of the authors and do not necessarily represent those of the European Commission.

<sup>1</sup> See, for example, the annual European Commission reports *Public Finances in EMU*.

<sup>2</sup> See, for example, Deroose, Larch and Schaechter (2008).

tax payers for the much larger public efforts to support the financial system. Against the background of the simultaneous discussions at global level in the G20 context, in the EU, this stimulus policy was manifested in the so-called “European Economic Recovery Plan” (EERP) adopted by the European Council in December 2008 based on a Commission proposal.<sup>3</sup> In essence, the EERP called for a coordinated EU crises response including a fiscal stimulus of overall at least 1.5 per cent of GDP over 2009-10 where measures should be “timely, temporary and targeted”. Out of this Member States were asked to contribute with 1.2 per cent of GDP, where the size of national contributions should take into account fiscal space, whereas the remaining 0.3 per cent of GDP should come from EU level actions. Against this background the objective of this paper is to give an overview of how the discretionary stimulus under the EERP has been distributed in euro area Member States and how this support has complemented the stabilisation provided by the automatic stabilisers.

The paper is organised as follows. On the basis of the Commission “EERP data base”, Section 2 provides a broad overview of the crises response measures taken in euro area member states. This includes the division of measures across policy objectives as well as their budgetary dimension including whether they are temporary or permanent. Section 3 then goes into more detail examining the sub set of discretionary measures that could be seen to top-up the automatic stabilisers. Section 4 follows with our concluding remarks.

## 2 Crises support measures in the euro area: an overview

The EERP called for a coordinated fiscal stimulus equivalent to 1.5 per cent of EU27 GDP over 2009-10, whereof 1.2 per cent of GDP should come from Member States. The stimuli measures should follow the “TTT principles”, that is, being timely, temporary and targeted, whilst taking into account national starting points. In addition, priority should also be given to structural reform measures as part of the Lisbon strategy for Growth and Jobs. There has been continuous follow up exercises where the assessment of the Commission and the Council so far has been positive in that broadly these ambitions have been met.<sup>4</sup> That is, the implementation of the EERP has been showing good progress and been in line with the principles agreed in the EERP. The objective here is not to confirm or question this assessment but merely to provide an overview of the support measures to the real economy implemented by euro area Member States on the basis of the measures included in the EERP data base<sup>5</sup> (see Box 1 for a description of the structure of the data base).

### 2.1 The euro area budgetary dimension of EERP stimulus

Euro area budget positions have deteriorated sharply in connection with the crises. According to the Commission Autumn Forecast (Table 2), on average, euro area deficits is projected to widen by almost 5 per cent of GDP over 2009 and 2010 and the average deficit position in the euro area to approach 7 per cent of GDP in 2010. Clearly the consolidation requirements in the years to come will be challenging. A fair share of this deterioration can be expected to be reversed in the recovery phase, in so far that it depends on the cycle. In the

<sup>3</sup> COM (2008) 800 final, 26/11/2008, *A European Economic Recovery Plan*. Available at: [http://ec.europa.eu/commission\\_barroso/president/pdf/Comm\\_20081126.pdf](http://ec.europa.eu/commission_barroso/president/pdf/Comm_20081126.pdf)

<sup>4</sup> Commission reports of the follow-up of the EERP have been presented in June 2009 and December 2009. See *Progress Report on the implementation of the European Economic Recovery Plan* of June 2009 and ditto, December 2009, available at [http://ec.europa.eu/financial-crisis/documentation/index\\_en.htm](http://ec.europa.eu/financial-crisis/documentation/index_en.htm)

<sup>5</sup> For a detailed overview of the measures in the data base in May 2009, see European Commission (2009).

### Box 1 Structure of the EERP Data Base

The EERP data base refers to reforms and measures that can help with the recovery process in the short-term, *i.e.* during 2009 and 2010, irrespective as to whether they were devised specifically as a response to the crises. The data base include information on reforms and measures that are relevant for (i) sustaining aggregate demand, (ii) sustaining employment, (iii) addressing competitiveness problems and (iv) protecting incomes of disadvantaged groups during that period. Financial market rescue packages are not included in the data base. However, consolidation measures are included in the data base. In practice, there is no clear separation between measures that are of a short term fiscal nature or a longer term structural nature. Accordingly, some “stimulus measures” can be purely of a budgetary and temporary nature or also be structural reforms with a budgetary impact. Measures have been classified according to *four broad types* of policy objectives with sub categories:

- *Measures and reforms aimed towards supporting industrial sectors, businesses and companies*, with sub-categories: (i) easing financing constraints for businesses/SMEs, (ii) sector-specific demand support, (iii) non-financial measures supporting business (e.g., regulatory) and (iv) sector-specific direct subsidies.

**Table 1**

#### Overview of the Number of Measures in the EERP Data Base

Member States	Policy Type				
	1 Supporting Industrial Sectors, Businesses and Companies	2 Supporting a Good Functioning of Labour Markets	3 Supporting the Investment Activity	4 Supporting the Households' Purchasing Power	5 Budgetary Consolidation
BE	16	25	11	14	15
DE	23	12	13	16	2
IE	7	4	9	10	30
EL	13	13	7	12	18
ES	50	16	20	17	7
FR	23	15	12	18	1
IT	43	29	20	27	21
CY	12	16	9	11	0
LU	8	3	7	8	0
MT	13	5	17	11	13
NL	18	8	32	3	1
AT	28	15	16	16	0
PT	16	8	7	11	0
SI	11	7	12	2	2
SK	10	10	7	8	4
FI	4	14	6	7	5
<b>TOTAL EA 16</b>	<b>295</b>	<b>200</b>	<b>205</b>	<b>191</b>	<b>119</b>
<i>(percent of the total)</i>	<i>29</i>	<i>20</i>	<i>20</i>	<i>19</i>	<i>12</i>

- *Measures and reforms aimed at supporting a good functioning of labour markets*, including: (i) promoting wage moderation, (ii) temporary working-time reduction, (iii) reduction of tax on labour, (iv) unemployment benefit system and social assistance and (v) easing labour market transitions (training, placement, other job-search help).
- *Measures and reforms aimed at supporting investment activity* including: (i) physical infrastructure, (ii) energy efficiency and (iii) R&D and innovation.
- *Measures and reforms that support household purchasing power*, including: (i) income support, general, (ii) income support, targeted and (iii) household subsidy for certain type of goods/services.
- *Budgetary consolidation measures*, including: (i) pure budgetary consolidation measure and (ii) financing of recovery measure.

In some cases, a measure can relevantly contribute to multiple policy objectives. For example, some labour market measures involving tax reductions also contribute to supporting household income. Also, tax reductions on the low paid can contribute both to supporting transitions on the labour market and bolstering income of vulnerable households. The resulting “double counting” implies that the 764 euro area measures are recorded 1010 times under different policy types. Measures have also been classified according to their duration. Temporary measures have a budgetary effect only in 2009 and/or 2010. They should be automatically reversed (e.g., measures with a limited budget envelope, a known ending date, or one-off measures). In that respect, investment projects are considered as temporary measures in the data base. Tax measures are considered as temporary only if the end date of the tax measure is indicated in the decision. If the reversal/change of the measure undertaken will require a new decision, it has been considered as permanent.

A detailed budgetary dimension (expenditures and revenues) of each measure for the year 2009 and 2010 is recorded in the data base in millions of Euro, with an indication of the “Off-budgets” or “below the line” amounts, essentially loan and guarantees, which potentially could have structural and possibly budgetary effects in the medium term. Figures are recorded as a change relative to the year 2008, also in 2010. In other words, if a measure is permanent, the amount of the stimulus is reported both for 2009 and 2010, while one-off measures appear only for the year when they occur. It should be noted that the information is in gross terms both on the expenditure and revenue sides and refers to the general government sector and state, regional, local and social security budgets.

Commission Autumn Forecast it is estimated that the cyclical budget component explains about half of the deterioration in the euro area as a whole (column 3). Nevertheless, in this juncture the estimates of the cyclical budget component are possibly more uncertain than ever, given the difficulty in knowing what are really the representative output gap as well as budgetary sensitivity to the cycle. Uncertainty is also increased by that some tax bases arguably have been structurally reduced in connection with the crises and much of such revenue will therefore not return in a future recovery.<sup>6</sup>

<sup>6</sup> See European Commission, *2009 Autumn Forecast* for some further comments on this issue.



Table 2

**Budgetary Developments over the 2010-08 Period**  
(percent of GDP)

Country	Budget Balance 2010	Change Budget Balance (2010-08)	Change Cyclical Component (2010-08)	Change in CAB (2010-08)	Change Revenue Ratio (2010-08)	Change Expenditure Ratio (2010-08)	EERP Stimulus 2009 (gross terms)	EERP Stimulus 2010 (gross terms)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BE	-5.9	-4.6	-2.4	-2.2	-0.8	3.8	1.1	1.1
DE	-5.0	-5.0	-2.9	-2.1	-0.4	4.6	1.7	2.4
IE	-14.7	-7.5	-3.1	-4.4	-0.5	7.0	0.7	1.0
EL	-12.3	-4.6	-2.1	-2.4	-3.4	1.1	0.6	0.0
ES	-10.1	-6.0	-1.9	-4.1	-1.4	4.6	2.4	0.8
FR	-8.3	-4.9	-1.6	-3.2	-2.4	2.4	1.6	1.4
IT	-5.3	-2.6	-2.3	-0.3	-0.5	2.1	0.8	0.8
CY	-5.7	-6.6	-1.6	-5.0	-1.4	5.2	2.3	1.9
LU	-4.2	-6.7	-3.1	-3.6	-0.5	6.2	3.4	2.2
MT	-4.4	0.3	-1.0	1.3	1.6	1.4	0.7	1.1
NL	-6.2	-6.8	-3.4	-3.4	-1.8	5.1	0.9	1.0
AT	-5.5	-5.0	-2.5	-2.5	-1.3	3.7	1.5	1.8
PT	-8.0	-5.3	-1.3	-4.0	0.3	5.6	1.1	0.6
SI	-7.0	-5.2	-4.2	-1.0	0.8	6.0	1.5	1.8
SK	-6.0	-3.7	-3.3	-0.4	-1.1	2.7	0.4	0.5
FI	-4.6	-8.7	-4.0	-4.7	-3.0	5.7	1.8	2.9
<b>EA</b>	<b>-6.9</b>	<b>-4.9</b>	<b>-2.4</b>	<b>-2.5</b>	<b>-1.2</b>	<b>3.7</b>	<b>1.5</b>	<b>1.5</b>

Source: European Commission (2009), *Autumn 2009 Forecast* and EERP data base.

On the basis of the EERP data base, the volume of the discretionary stimulus is estimated to be 1.5 per cent of GDP in 2009 and 1.5 per cent of GDP in 2010. This is in gross terms and compared to 2008 and as such seems to achieve the 1.2 per cent of GDP objective in the EERP with a margin. It should be noted that in some countries there has also been substantive measures taken in order to finance the stimulus or limit the budget deterioration given the lack of fiscal space (see Table 3). Therefore, in net terms the EERP stimulus is about a third lower than in gross terms (2 instead of 3 per cent of GDP). Overall, these figures indicate that roughly about a quarter of the deterioration of budget positions between 2008 and 2010 could potentially be explained by the EERP stimulus.<sup>7</sup> In other words, three quarters of the deterioration in budget positions is rather explained by other cyclical, structural or one-off factors.

<sup>7</sup> However, it should be noted that the information in the EERP data base is fully national accounts based, so the analysis here is only indicative, see also Box 1.

Table 3

## Overview of Discretionary Stimulus in EU Member States

	Fiscal Policy													
	Change in Fiscal Balance (Aggregate over 2008-10) <sup>(1)</sup>	Discretionary Stimulus in 2009					Consolidation Measures in 2009	Discretionary Stimulus in 2010					Consolidation Measures in 2010	
		Overall (Gross Terms)	of which:					Overall (Gross Terms)	of which:					
			Measures Aimed at Households	Increased Spending on Labour Market	Measures Aimed at Businesses	Increased Investment Expenditure			Measures Aimed at Households	Increased Spending on Labour Market	Measures Aimed at Businesses	Increased Investment Expenditure		
	<i>p.p. change</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	<i>percent of GDP</i>	
BE	-4.6	1.1	0.5	0.2	0.2	0.2	0.0	1.1	0.3	0.5	0.1	0.1	-0.9	BE
DE	-5.0	1.7	0.5	0.4	0.5	0.4	0.0	2.4	1.1	0.4	0.4	0.4	0.0	DE
IE	-7.5	0.7	0.4	0.1	0.2	0.0	-5.4	1.0	0.6	0.2	0.2	0.0	-10.2	IE
EL	-4.6	0.6	0.5	0.1	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	-1.8	EL
ES	-6.0	2.4	0.5	0.1	0.8	0.9	-0.3	0.8	0.2	0.0	0.1	0.5	-0.9	ES
FR	-4.9	1.6	0.3	0.1	0.9	0.3	0.0	1.4	0.3	0.0	1.0	0.1	-0.1	FR
IT	-2.6	0.8	0.2	0.1	0.3	0.2	-0.9	0.8	0.1	0.2	0.3	0.1	-0.8	IT
CY	-6.6	2.3	0.9	0.1	0.3	1.4	0.0	1.9	0.7	0.1	0.6	1.1	0.0	CY
LU	-6.7	3.4	1.6	0.3	0.3	1.1	0.0	2.2	1.4	0.0	0.5	0.3	0.0	LU
MT	0.3	0.7	0.2	0.0	0.2	0.2	-1.7	1.1	0.6	0.0	0.2	0.3	-2.2	MT
NL	-6.8	0.9	0.2	0.1	0.3	0.2	-0.2	1.0	0.2	0.1	0.3	0.4	-0.1	NL
AT	-5.0	1.5	1.1	0.3	0.0	0.1	0.0	1.8	1.3	0.3	0.1	0.0	0.0	AT
PT	-5.3	1.1	0.2	0.2	0.3	0.4	0.0	0.6	0.2	0.3	0.1	0.0	0.0	PT
SI	-5.2	1.5	0.1	0.1	0.8	0.4	-1.0	1.8	0.1	0.3	1.0	0.4	-1.7	SI
SK	-3.7	0.4	0.2	0.1	0.0	0.1	-0.5	0.5	0.3	0.1	0.1	0.1	-1.1	SK
FI	-8.7	1.8	1.0	0.0	0.2	0.3	0.0	2.9	1.7	0.1	0.5	0.4	-0.4	FI
EA16	-4.9	1.5	0.4	0.2	0.5	0.4	-0.3	1.5	0.5	0.2	0.4	0.3	-0.6	EA16

Notes. <sup>(1)</sup> European Commission services' *Autumn Forecast 2009*.

Source: European Commission services' data base on recovery measures.

## 2.2 The national budgetary dimension of EERP stimulus

The size of the EERP discretionary stimulus over 2009-10 nevertheless differs substantially across Member States. This could partially reflect differences in the depth of the crises and thus the need for additional stabilisation efforts, over and beyond the automatic stabilisers. However, it is arguably a stronger reflection of that the room of manoeuvre in terms of deficit and debt levels as well as external imbalances varied across countries going into the crises, in other words, some countries had more fiscal space than others.<sup>8</sup> As suggested by Table 3, discretionary stimulus efforts have been larger than average in Germany, Luxembourg and Finland. In all these countries the budget position was strong going into the crises and external imbalances limited. Additional stimuli have on the other hand been clearly below average in Ireland, Greece and Malta where the consolidation measures have more than offset any stimuli. Efforts have also been relatively small in Portugal, Slovenia and Slovakia. For other countries, the situation appears to be more mixed. In some countries where the fiscal space should be restricted, the stimulus has in any case been relatively strong, for example Spain where most of the efforts have been concentrated in 2009 (whereas consolidation measures are larger 2010).

## 2.3 The policy objectives of the EERP stimulus

According to the principles of the EERP, the real economy stimulus should be well targeted in order to achieve the highest demand impact. The support measures in the data base have been classified under four different policy objectives (see Box 1), namely: support to households and vulnerable groups; support to labour markets; support to industry and business and finally investment support.<sup>9</sup> In budgetary terms, Table 3 indicates that out of the total 3 per cent of GDP of support measures over 2009-10, about 0.9 per cent of GDP have been directed towards the support of households while the resources spent to support labour markets have been considerably less at 0.4 per cent of GDP, possibly reflecting the lagged impact of the crises on labour market conditions and unemployment. Measures to support businesses and product markets make up about 0.9 per cent of GDP and investments 0.7 per cent of GDP.<sup>10</sup> As regards the individual policy objectives the following broad observations can be made as regards the type of policies taken:

- *Measures to support household purchasing power.* General changes of income tax schemes have been implemented in several Member States which have the advantage of being transparent, easily implemented, unbiased towards specific sectors, and increase incentives to work. On the other hand, they may be less efficient since high income earners have a relatively low propensity to consume while they are often costly from a fiscal perspective, which may explain their limited scope in many Member States.<sup>11</sup> Finally, a relatively large number of countries have introduced measures that target low income households although they often are of a quite limited overall size in terms of budget impact. As low income households also covers unemployed persons it would seem to be a group negatively hit by the crises.
- *Measures and reforms aimed at supporting a good functioning of labour markets.* Many of them facilitate flexibility within firms (through retraining and working time arrangement) or labour market transition between firms (through job placement, training, and encouragement to

<sup>8</sup> See Section IV.3 in *Public Finances in EMU-2009* where an indicator of “fiscal space” is presented.

<sup>9</sup> The financial sector support schemes are not covered by the data base.

<sup>10</sup> In terms of a simple measure counting, around 29 per cent has been directed towards measures that support businesses, 20 per cent to supporting labour markets, 20 per cent to investment activities, and 19 per cent as support to households’ purchasing power (including vulnerable groups). See Table 1 in Box 1.

<sup>11</sup> Even so, general tax reductions have been more pronounced in Member States where these tax cuts, in particular on labour income, have been part of a longer term structural policy agenda to lower taxes on labour.

geographical mobility). Reduction of taxes on labour is applied in many Member States and can boost both labour demand and labour supply while supporting household purchasing power. As regards measures with the potential to directly affect wages in the short term they have been relatively scarce. There have however been measures to boost labour demand through reductions in social security contribution, cutting income taxes. Rebates on social security contributions to boost labour demand have been taken in a number of euro area members and have then typically been made conditional upon job creation. Many euro area countries have either introduced new forms of public support to flexible working time or temporary unemployment, or extended the duration and/or the level of already existing public support (these measures are dealt with further in the next section).

- *Measures aimed at supporting industrial sectors, businesses and companies.* Overall, there have been quite a number of initiatives taken in these areas across euro area countries and the budgetary amounts involved are in cases substantial. Almost all euro area countries have moved to counteract the drying up of credit for businesses in various ways. Measures also relates to the support of sectors particularly hard-hit by the crisis, that is, automotive, construction, tourism varying on the country. As regards demand measures, car-scrapping schemes have been implemented in several countries (FR, PT, IT, ES, LU, DE, AT, SK, CY, NL, IE) with the German version being the most extensive example. Other sectors where demand support measures have been taken are construction (FR, IE, ES).
- *Measures to support investment activity.* This relates to physical infrastructure, R&D and energy efficiency. The prominence attached to public investment in recovery efforts varies considerably across Member States, with the largest increases in spending as a percentage point of GDP observed in DE, CY, ES, NL, SI while support to investment in euro area countries facing larger budgetary restrictions are less. Nearly all Member States have announced measures aimed at supporting investment in physical infrastructure. By type of physical infrastructure, a majority of the measures aim at supporting investment in transport infrastructure. The biggest group of them are related to the road and/or railway sectors.

#### 2.4 *The temporary versus permanent dimension of EERP measures*

According to the principles of the EERP, the stimulus measures should be of a temporary nature unless they are part of a longer term reform agenda with a positive structural impact. Therefore, the measures in the data base have also been classified as being “temporary” or “permanent” in terms of their budget impact (see Box 1 for classification criteria used). The information has admittedly not always been complete and the dividing line between the two concepts not always fully clear.

On the basis of the classification made in the data base, out of the 1.5 per cent of GDP of overall stimulus in 2010, 0.6 per cent of GDP is classified as being of a temporary nature, thus implying that their budgetary impact should fade off. In the context of the accumulated 3.0 per cent of GDP discretionary stimulus over 2009 and 2010, this suggests that the large majority share of the budgetary impact would indeed be of a temporary nature. Looking at the temporary measures in the field of labour markets and income support, they amount to 0.2 per cent of GDP in 2009 and 2010. In this category, most measures have well-known ending dates or budgets clearly limited in time. The proportion of permanent measures to support households’ purchasing power is also significant: 0.3 per cent in 2009 increasing to 0.6 per cent of GDP in 2010 and the measures concerned are concentrated in the field of labour taxation and income support. The budgetary impact of temporary measures to support business is amounts to 0.4 per cent of GDP in 2009 and 0.2 per cent in 2010. Of course, there is also a fairly large amount of off budget measures that should be considered in this context, including loans and guarantees. However, these measures do

Table 4

**The Temporary Versus Permanent Dimension of EERP Measures**  
(percent of GDP)

<b>EA16</b>	<b>2009</b>		<b>2010</b>	
<b>Total temporary measures</b>	<b>1.1</b>		<b>0.6</b>	
1. Supporting industrial sectors, businesses and companies	0.4		0.2	
2. Supporting a good functioning of labour markets	0.1		0.2	
3. Supporting the investment activity	0.4		0.2	
4. Supporting the household purchasing power	0.1		0.0	
<b>Total permanent measures</b>	<b>0.4</b>		<b>0.8</b>	
1. Supporting industrial sectors, businesses and companies	0.1		0.3	
2. Supporting a good functioning of labour markets	0.0		0.1	
3. Supporting the investment activity	0.0		0.0	
4. Supporting the household purchasing power	0.3		0.5	
<b>Total EERP measures in the Euro area</b>	<b>1.5</b>		<b>1.5</b>	
<b>Budgetary consolidation in the Euro area</b>	<b>-0.3</b>		<b>-0.6</b>	
<b>Member States</b>	<b>Temporary Measures</b>	<b>Permanent Measures</b>	<b>Temporary Measures</b>	<b>Permanent Measures</b>
Belgium	0.4	0.7	0.1	1.0
Germany	1.2	0.5	1.0	1.5
Ireland	0.1	0.6	0.2	0.8
Greece	0.6	0.0	0.0	0.0
Spain	2.2	0.2	0.5	0.2
France	1.3	0.2	0.4	1.0
Italy	0.6	0.2	0.7	0.1
Cyprus	1.8	0.5	1.6	0.4
Luxembourg	0.7	2.7	0.3	1.9
Malta	0.3	0.4	0.4	0.7
Netherlands	0.5	0.3	0.6	0.4
Austria	0.2	1.2	0.3	1.5
Portugal	0.8	0.3	0.3	0.3
Slovenia	0.4	1.1	0.6	1.2
Slovakia	0.4	0.0	0.5	0.0
Finland	0.5	1.3	0.6	2.3
<b>EA16</b>	<b>1.1</b>	<b>0.4</b>	<b>0.6</b>	<b>0.8</b>

Source: European Commission and own computations.

not affect public deficits in the immediate future. Still, in 2010, 0.9 per cent of GDP consists of permanent measures with a durable impact on budget balances. The bulk of these permanent measures (equivalent to 0.5 per cent of GDP) are aimed at supporting household purchasing power and a proper functioning of labour market, mainly via labour tax cuts. Their true motivation is often to strengthen incentives to work and is thus part of a longer term agenda. At a country level, Germany, Finland, Luxembourg and Austria seem particularly concerned.

### 3 EERP measures, automatic stabilisers and automatic stabilisation

The recognition that discretionary fiscal stimulus can be a useful stabilisation tool has seemingly revived the interest in questions linked to automatic stabilisation and the complementary role of discretionary policies. Issues are whether there are efficient ways to strengthen the automatic stabilisers? Can discretionary stimuli become more like the automatic stabilisers, for example by increasing their automaticity by using *ex ante* rules ensuring that additional stimuli is well targeted and temporary? Therefore, the recovery measures in euro area member states<sup>12</sup> are classified according to what extent they deepen the impact of existing automatic stabilisation or whether they broadened their impact by focussing on recipients otherwise not covered. As above, the information draws on a Commission data base set up for the surveillance of the implementation of the European Economic Recovery Programme (EERP).

#### 3.1 *Automatic stabilisers and their freedom to play: a budgetary versus a stabilisation perspective*

Euro area members benefit from the stabilisation provided by their large and encompassing welfare states. Indeed, it is today consensual advice, qualified on the availability of fiscal space, that the budget automatic stabilisers should be allowed to “play freely”, including in downswings. However, what it actually implies in practice to let the automatic stabilisers “play freely” can be addressed from different sides of the same coin and below a differentiation is made between the “budgetary impact” side or the “stabilisation provision” side.

Arguably, the most common approach is to look at the automatic stabilisers from a “budgetary impact” perspective. Focus is then on estimating the cyclical budget component which is defined through the elements in the budget that vary systematically with the cycle, thus inducing to a counter-cyclical movement in the budget deficit position. The budget elements involved come from both the revenue side and expenditure side of the budget. On the revenue side, cyclically sensitive tax bases such as personal and corporate income taxes, social security contributions and consumption taxes are taken into account. Work has also been done to look at capital taxes linked to movements in asset prices.<sup>13</sup> If tax rates are progressive it adds to the size of the automatic stabilisers. On the expenditure side, the measurement of automatic stabilisers is usually confined to unemployment benefits as unemployment rates vary counter-cyclically. It is more difficult to find clear automatic cyclical patterns for other expenditure areas, but also here work is on-going.<sup>14</sup> In addition, there is a debate on where the line should be drawn between what is really automatic or discretionary. In some cases it can be observed that government behaviour is such that certain measures are taken over time systematically with the cycle albeit they formally require a discretionary decision and thus are not rules based. Overall, the budgetary impact from the automatic stabilisers is mainly associated with the tax side. According to the standard approach, the budgetary elasticity used to capture the size of the cyclical component (the elasticity is about 0.5 in the euro area on average and is multiplied with the estimated output gap), about 80 per cent stem from the tax side (0.4) while the remaining 20 per cent stem from the unemployment benefit contribution (0.1).<sup>15</sup>

<sup>12</sup> While the EERP covers the whole EU27, in this paper for reasons of limited resources, the discussion has been limited to euro area countries.

<sup>13</sup> See, for example, Girouard and Price (2004).

<sup>14</sup> See, for example, Darby and Méltitz (2008).

<sup>15</sup> See Girouard and André (2005).

In order to measure the “stabilisation impact” of automatic stabilisers, the basic approach is to contrast a situation when they are allowed to “play freely” with a situation when they are restricted or “turned off”.<sup>16</sup> There are several technical options available to do this, but in principle a simulation is made where the impact on growth when automatic stabilisers are playing freely is compared to the situation when the fluctuation in budgetary revenues are fully compensated by tax hikes and expenditure increases by expenditure cuts. This approach follows the apparent logic of the definition of automatic stabilisers from the budgetary impact side. Nevertheless, an issue to consider is what the results imply in terms of stabilisation provision and the support provided to households (in a down turn) through the automatic stabilisers. In particular, if the benchmark for comparison is the case when all taxes and expenditures are lump sum (or alternatively a strict budget annual budget balance rule applies) the question arises what the results actually implies, especially if the underlying question is how much stabilisation or support that has been provided through the budget.

Consider an illustrative example. A household before a downturn earns 100 and faces a proportional income tax rate of 50 per cent. It then pays 50 in tax, leaving a net income of 50. If in the downturn the household gross income fall by half to 50, it then pays 25 in taxes, seeing its net income half to 25. Thus, government tax revenue falls by 25. If the benchmark is proportional taxes then one would conclude that there is no stabilisation provided. However, arguably, if the benchmark used instead is lump sum taxes (as described above) this would be described as a case with a support of 25 to households from the automatic stabilisers through the tax side. Nevertheless, household income fall by half and the fact that the governments abstain from raising the tax rate to 100 per cent, in order to keep tax income at 50, appear to be a rather indirect and “virtual” stimulus seen from the point of view of households.

From the other side of the coin, *i.e.* the “stabilisation provision” side the perspective is reversed and it is in fact the non-cyclicalities of government expenditures that provide the bulk of the automatic budget stabilisation. The basic mechanism is that the majority of government expenditures are not cyclically sensitive, and thus not cut or increased in a rules based and pro-cyclical way, which provides a large block of stability in the economy. This is not new, it is a common empirical conclusion that the degree of stabilisation tend to increase with the size of government.<sup>17</sup> From this perspective, letting the automatic stabilisers to “play freely”, in a down turn, implies focussing on that:

- planned non-cyclical expenditures are not cut;
- unemployment benefits are paid according to set rules and are not cut;
- that there is full financing, through borrowing, of expenditures despite the fall in revenues, *i.e.*, there are no pro-cyclical tax hikes to compensate for falling revenues.

In a debate on whether and how the automatic stabilisers can be strengthened it arguably makes a difference whether the discussion is framed around a definition of automatic stabilisers seen from the “budgetary impact” or “stabilisation provision” perspective as described above. Inputs in this debate seemingly often take a budgetary impact perspective as the starting point and therefore focus on the revenue side looking at the progressivity of tax rates, temporary changes in tax rates and, on the expenditure side, temporary increases in the generosity of the unemployment benefit system. However, if the final objective is to strengthen automatic stabilisation, then mechanisms to ensure that government non-cyclical expenditures are financed to be spent according to plan in bad times, not suffering from cuts, should also stand in focus together with mechanisms in good times to ensure that expenditures meant to be temporary do not become

<sup>16</sup> See, for example, Sekkat, Van den Noord, Buti and Martinez-Mongay (2002).

<sup>17</sup> See, for example, Fatás and Mihov (2001).

permanent. Indeed, there is an asymmetry at play here where in many countries, over time, expenditures have been raised permanently in good times leading to a gradual increase in the size of the public sector and tax pressure over time, possibly leading to higher inefficiencies in the economy.

### 3.2 *An overview of the EERP stimulus measures in relation to automatic stabilisers*

The discretionary stimulus measures taken and planned by euro area member states in the context of the EERP are examined below from an automatic stabilisation perspective. The typology allows for observations that are relevant in a more general discussion on how to strengthen automatic stabilisation and how discretionary stimulus would fit in this context. A distinction can also be made between “direct” stabilisation measures referring to measures that add additional support to the economy and “indirect” stabilisation measures that defend against pro-cyclical volume cuts.

- Discretionary measures that add on top of the automatic stabilisers: expenditure side
  - 1) top up of unemployment benefits;
  - 2) financial resources for agencies, local government etc, to finance planned expenditures including public employment.
- Discretionary measures that add on top of the automatic stabilisers: revenue side
  - 3) Changes in tax rates (income, corporate or consumption taxes) and social security contribution rates, including to what extent there is an impact on progressivity.
- Discretionary measures that provide stimulus complementing automatic stabilisers
  - 4) Investments over and beyond original plans, additional benefits to targeted and vulnerable groups, other.

Indeed, given that the automatic stabilisers are generally not designed with stabilisation provision as the primary objective,<sup>18</sup> and that this thus to a large extent is a by-product, it is not obvious that, depending on the type and size of the shock,<sup>19</sup> the stabilisation provided is sufficiently well targeted. An issue to examine is therefore how much of the discretionary stimulus provided under the EERP that relate to areas outside the coverage of existing automatic stabilisers and how much that has directly built on the existing structures of automatic stabilisers.

At an aggregate level, Table 5 suggests that, in budgetary terms, the split is fairly even between measures that build on, and thus deepen or broaden, the provision of automatic stabilisation and other stimulus measures, for example measures that relate to increased investment expenditures which is the ticket item together with additional support to households and vulnerable groups. Looking instead at the consolidation measures, Table 6 suggests that there have been noticeable pro-cyclical cuts in public expenditures (worth 0.2 per cent of GDP) and increases of other taxes. The discussion below looks at these elements in more detail, seen from the expenditure and revenue side of the budget.

#### 3.2.1 *Discretionary stimulus that build on the automatic stabilisers: expenditure side*

On the expenditure side, there are many examples of measures that either top up benefits

<sup>18</sup> The primary objectives of tax systems are rather concerns linked to financing, equity and efficiency.

<sup>19</sup> Indeed, it is often remarked that if there is a supply shock the automatic stabiliser can be counter productive by postponing necessary adjustment.



Table 5

**Stimulus measures in EERP data base, 2009-10**  
*percent of GDP*

Member States	Stimulus Related to the Automatic Stabilisation									Other Stimulus				
	Expenditure			Revenue										
	Top up of Unemployment Benefits	STWA	Financial Support for Government Expenditures and Public Employment	Labour Income Taxes		Social Security Contributions		Corporate Taxes		Consumption Taxes (VAT)	Other Taxes and Various Tax Credits	Investment Expenditures	Expenditures to Support Vulnerable Groups	Other Stimulus (Regulatory, Sectoral Support, Easing Labour Market Transitions)
				Increasing Progressivity	Other	Employees	Employers	Increasing Progressivity	Other					
BE	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.3	0.1	0.4	0.1
DE	0.0	0.1	0.0	0.4	0.0	1.1		0.0	0.5	0.0	0.0	0.8	0.7	0.4
IE	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.3
EL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
ES	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.6	0.5	1.2	0.0	0.3
FR	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	1.3	0.2	0.0	0.5	0.3	0.1
IT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.3	0.4
CY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	2.5	1.1	0.6
LU	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	2.9	0.9	0.5	0.1
MT	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.5
NL	0.0	0.1	0.0	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.2	0.6	0.2	0.0
AT	0.0	0.2	0.0	0.0	1.8	0.2	0.0	0.0	0.1	0.2	0.1	0.1	0.6	0.1
PT	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1	0.4	0.4	0.2
SI	0.0	0.5	0.3	0.1	0.0	0.0	0.0	0.6	1.7	0.0	0.0	0.0	0.1	0.1
SK	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
FI	0.0	0.0	0.5	0.0	2.3	0.0	0.7	0.0	0.1	0.3	0.0	0.7	0.2	0.1
TOTAL EA 16 percent total	0.0 1%	0.1 2%	0.1 3%	0.2 6%	0.1 4%	0.4 12%		0.0 0%	0.5 16%	0.1 5%	0.2 7%	0.6 20%	0.4 14%	0.3 9%
Temporary	100%	100%	364%	12%	20%	35%		0%	67%	41%	52%	83%	31%	84%

directly or work to widen and soften eligibility criteria. While generally of a temporary nature, such measures do increase stabilisation properties if maintained. However, in this case there would be efficiency concerns related to the incentives to work looking forward. While measures that increase the generosity of unemployment systems arguably provide additional support in a direct way, measures that protect already planned demand provide support only indirectly. In the debate on fiscal rules it is recognised that annual budget balance rules can have a pro-cyclical impact, and that multi-annual rules are preferable from this perspective (such as the “close-to-balance over the cycle” rule in the Stability and Growth Pact). In this context the relationship between local government, where much of the consumption takes place, and central government, where much of the revenues are collected could be important as local level borrowing is in many cases restricted from the centre. However, the measures included in the data base do not reveal that this has been a particular concern so far. There are examples of measures providing additional support to local government but then mainly related to subsidies for additional investments at local level. More precisely:

- *measures that top up unemployment benefits.* Measures under this heading has been taken in several countries (EL, IT, BE, PT, FR, ES), even though the budgetary impact has been overall rather small. Some countries decided to increase the generosity of unemployment benefits in level or in duration (in BE, EL, IT and PT). Others decided to extend their coverage to include temporary and interim workers (in FR, IT). In Spain a new allowance of 420 € for unemployed who have lost their eligibility to unemployment benefits was made available. In all these cases the measures are of a temporary nature. It should arguably be taken into account that the generosity of the existing unemployment insurance systems varies across euro area Euro area members in the starting points and accordingly also the need for additional top ups in times of rapidly deteriorating labour market conditions. The extension of benefit arrangements to groups formerly not insured, or who have lost their rights, can reach a large numbers of vulnerable households (recently laid-off workers, long term unemployed and other low-income households);
- *short term working schemes.*<sup>20</sup> In practice these schemes differ in nature across countries and it is not straightforward whether to see them as predominantly as a way to avoid lay offs, or whether they should be seen mainly as a way to top-up the salary for employees that otherwise would only get a part time based income. Indeed, in STW and temporary lay-off public schemes are also known as “partial” or “temporary unemployment”, for example in Belgium, France and Luxembourg. Some Member States have introduced new short term working schemes (notably NL, PT, SI, SK), while others have extended the duration and/or the level of already existing ones (e.g., DE). Their coverage has been extended in BE, FR and IT to include employees on fixed-term contracts and in small companies. More generally, although STW schemes are justified in times of crisis, the main risk is that they can inhibit necessary restructuring, and this calls for strict time limits and eligibility criteria;
- *financial support to support to government, agencies etc., to support expenditures and public employment.* In this category measures have in fact only been identified in a few countries. In France, central government VAT repayments to local authorities have been speeded up. A general move towards shorter lags in principle helps to strengthen the efficiency of automatic stabilisers. In Germany, there has been some support to structurally weak communes to carry out investments. In Italy the financing for the payment of social security benefits have been strengthened. In order to strengthen local government finances, Finland increased the share of

<sup>20</sup> Short-time work (STW) can be defined as a temporary reduction in working time intended to maintain an existing employer/employee relationship. It can involve either a partial reduction in the normal working week for a limited period of time, i.e. a partial suspension of the employment contract, or a temporary lay-off (zero hours' week), i.e. a full suspension of the employment contract. In both cases, the employment contract continues and is not broken.

corporate income tax revenues that are directed to municipalities and allowed for the upper real estate tax limit for local governments to be increased.

### 3.2.2 *Discretionary stimulus that build on the automatic stabilisers: revenue side*

Automatic variations in VAT rates could be one way to strengthen the automatic stabilisers, *i.e.*, a rule based increase in good times neutralised by a rules based decrease in bad times,<sup>21</sup> with the key feature that it could be a measure that could be quickly implemented and of substantial budgetary magnitude, shifting consumption demand in time. The key example in the EU in this category has nevertheless come from outside the euro area, namely the temporary general VAT cut in the UK. Also, in the euro area there have been some cuts in VAT rates albeit generally of a targeted nature. Stabilisation properties can also be strengthened by measures that increase the progressivity in tax systems. In this context there has been a wide set of temporary measures taken with a view to support low income households or low income earners. In general such measures are both well targeted and in line with strategies to strengthen work incentives. More precisely:

- *income taxes.* Measures that relate to income taxes have been taken in about half of euro area countries and in several countries these are relatively substantial. To a large extent these measures have been permanent and this relates in particular to the income tax cuts in Finland and Austria, which broadly should be seen in a longer term agenda to reduce tax on labour and improve incentives to work. However, of course, to some extent these measures reduce the future degree of automatic stabilisation. Beyond these broader measures, quite a few countries have taken other income tax measures that indirectly increase the degree of progressivity, such as reduction in the bottom personal income tax rate (DE) or for low income earners (FR). In MT income tax bands have been revised by broadening the tax free range of household income, thus raising progressivity;
- *social security contributions.* For the euro area as a whole, measures with a view to cut social security contributions have been substantial even though actions have concentrated to a few countries and then in particular the temporary reductions in Germany. In the Netherlands, unemployment benefit premiums paid by employees have been abolished;
- *corporate taxes.* Measures with a view to reduce corporate taxation have been taken in a majority of countries and corporate taxes have been lowered on a permanent basis in several euro area countries (FR, DE, LU, SI, SK) and on a more temporary basis in others (NL, PT, EL, ES). In Germany, a main measure relate to an increase in depreciation rates and interest ceilings. In Slovenia, tax rates have been cut and the deductibility of investment costs has been increased. Also, in France the depreciation rate of investments have been increased;
- *consumption taxes.* Changes to consumption taxes. In Belgium there has been a targeted cut of VAT towards construction. As indicated above, in France, central government VAT repayments to local authorities have been speeded up.

### 3.2.3 *Discretionary measures that add stimulus outside the areas covered by automatic stabilisation and consolidation measures*

About half of the overall stimulus provided under the EERP relate to measures targeted to areas outside the coverage of automatic stabilisation. The larger items are investments expenditures, where multipliers are potentially large, and towards households and vulnerable groups where in the current juncture the propensity to consume could also be relatively large. As

<sup>21</sup> See, for example, SOU (2002).

Table 6

## Consolidation Measures in EERP Data Base, 2009-10

Member States	Budgetary Consolidation Measures							
	Expenditure				Revenue			
	Cuts in Expenditure Support to Government Agencies, etc. Cut in Public Employment and Wage Freeze	Cuts in Investment Spendings	Reduction in Social Benefits Transfers that Affect Vulnerable Groups	Elimination of Various Subsidies	Increase in Labour Income Taxes (PIT)	Increase in Corporate Taxes	Increase in Consumption Taxes (VAT)	Other Taxes (Raising Taxes on Alcohol, Higher Excise Duties on Fuel)
BE	-0.3	0.0	-0.1	0.0	-0.2	-0.1	0.0	-0.3
DE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IE	-4.0	-3.2	-1.2	0.0	-2.2	-0.3	-0.2	-4.7
EL	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	-2.0
ES	-0.2	0.0	0.0	0.0	0.0	-0.5	-0.2	-0.2
FR	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
IT	-0.5	0.0	0.0	0.0	0.0	-0.4	0.0	-0.8
CY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8
LU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MT	-0.3	0.0	0.0	-2.7	0.0	0.0	0.0	-1.0
NL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3
AT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SI	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	-1.5
SK	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	-0.2
FI	-0.1	0.0	0.0	0.0	0.0	0.0	-0.2	-0.1
<b>TOTAL EA 16</b>	<b>-0.2</b>	<b>-0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-0.1</b>	<b>0.0</b>	<b>-0.3</b>
<i>percent of total</i>	<i>25%</i>	<i>6%</i>	<i>4%</i>	<i>0%</i>	<i>5%</i>	<i>16%</i>	<i>4%</i>	<i>38%</i>
<b>Temporary</b>	<b>51%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>49%</b>	<b>0%</b>	<b>40%</b>

pointed to in the previous section, there has also been substantial support to industry, in particular the automotive sector and construction sector, as well as measures to improve the access to finance.

As already pointed out (see Table 3), in terms of overall size, consolidation measures have been mainly concentrated to the countries with the most unbalanced fiscal positions, such as Ireland and Greece where the former have applied a broad based approach. In terms of the concentration of measures, Table 6 suggests that pro-cyclical cuts in public employment and wages have played a role, indicating that the automatic stabilisation has been reduced. A general positive feature is that investment spending has generally been protected. As regards tax increases, measures have concentrated on “other taxes”

In the case where the discretionary stimulus could be seen as a top up of the automatic stabilisers, a question is how much this has implied a “deepening”, in terms of increasing their impact, and how much can be related to a “broadening” in terms of extending the coverage of recipients. For example, one way to increase the stabilisation properties of tax systems is to reduce

the lags between economic activity and the ensuing tax payments.<sup>22</sup> The smaller the lag the higher is the stabilisation properties and measures contributing towards this end therefore strengthen the stabilisation properties.<sup>23</sup> In particular, corporate income tax is paid with a lag on the basis of the income in previous years. There are some examples of measures that move in this direction that is, shortening the lags in the system, for example quicker repayments of VAT in some countries.

#### 4 Concluding remarks

Euro area countries have addressed the impact of the crises by a broad use of the budgetary instruments available, including discretionary fiscal stimuli. Generally, the automatic stabilisers have been allowed to “play freely” in the sense that the cyclical budget impact has, by and large, been allowed to influence budget positions without restraint, except in cases where the budgetary room of manoeuvre has been severely limited. For example, in Ireland substantial budget consolidation measures have instead been taken and in Greece such measures are currently in the pipeline.

The broad overview of the discretionary stimulus provided by euro area governments in the Commission’s EERP data base indicates that they have been targeted towards investment expenditures, where multipliers are large, and towards households and vulnerable groups where in the current juncture the propensity to consume also should be relatively large. There has also been substantial support to industry, in particular the automotive sector and construction sector, as well as measures to improve the access to finance. It would seem that measures supporting labour markets have been relatively less prominent, possibly explained by the lag between growth and unemployment, even if the general impression is that in many countries the short-term working schemes have indeed helped to contain unemployment, even if only temporarily. Here, the absence of some type of measures, such as widening the access to early retirement schemes, which reduces labour supply, or large scale public employment creation schemes can also be positively noted as a break with the past. Moreover, most of the discretionary stimulus appears to be of a temporary nature while the bulk of stimulus measures with a more permanent impact have tended to relate to reductions in labour income taxes, contributing also to longer term agendas to reduce taxes on labour.

The crises have illustrated that while automatic stabilisation may be sufficient in normal cyclical conditions there is a role for discretionary policies in recessions and over-heating periods. The advantage of discretionary stimulus is that it can be designed to address the particular expressions of the crises/overheating at hand. This time, for example, the financial sector, the automotive sector and a sizeable fall in investments have been key characteristics and this is also where most of the discretionary stimulus has been directed. Measures to strengthen the existing automatic stabilisers will most likely not help in this respect. Likewise, proposals for rules based discretionary stimulus schemes, conditioned on pre-specified indicator based triggers, will most likely suffer from the same weakness.

Instead, the crises experience indicates the value of having a strategy and principles in place for how to best design and condition discretionary stimulus. The EERP could in this respect be seen as a success in that EMU members seem, so far, to have kept the agreed principles in mind in the national formulation of stimulus. In addition, the ability to also agree on common principles for the actual withdrawal of temporary measures to help ensuring that they indeed stay temporary is

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<sup>22</sup> Baunsgaard and Symansky (2009).

<sup>23</sup> It can be noted that in the estimation of the standard budgetary elasticity to the cycle by the OECD, a correction for the lag structure in corporate and personal income tax structures have been introduced (Girouard and André, 2005).

also positive.<sup>24</sup> This experience can be built upon and the principles for what, how and under what conditions discretionary stimulus policies could play a positive role can be further developed, whilst acknowledging that there must be enough flexibility to allow the measures taken to be well targeted given that each crises/overheating period will be different from the one before.

This argument is supported by another key lesson illustrated by the crises, namely the importance of having enough fiscal space going into a down turn not to be forced to adopt a pro-cyclical fiscal stance. In the coming years, the challenge of fiscal consolidation is a commonly shared one. This will require cuts in public expenditures and higher tax revenues. A gradual trimming of the size of government can promote efficiency but may also lead to less automatic stabilisation, given that the provision of stabilisation increase with government size. In this context, the impact of policies on the degree of automatic stabilisation should not be a primary concern. Indeed, there has been some research indicating that an optimal government size could lie as at such a low level as 40 per cent of GDP, a level that most euro area countries have bypassed.<sup>25</sup> Tax increases can on the other hand strengthen the automatic stabilisers but again at the possible expense of efficiency, of course depending on the design choices. Again, efficiency should be the primary concern and not the impact on stabilisation.

The overview of the discretionary measures taken by euro area members in this paper only provides some tentative indications at best, in particular as regards the interplay with the automatic stabilisers and the provision of automatic stabilisation. However, looking forward and with the benefit of increasing hindsight, there will surely be opportunity to draw more substantiated lessons from the experience with budget based stabilisation tools from this economic crises episode, hopefully in time to shape policies already in the upcoming recovery.

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<sup>24</sup> Council of the European Union (2010), "Council Conclusions on Exit Strategies for Crises-related Measures in Labour and Product Markets", 7588/10, 16 March.

<sup>25</sup> See Buti *et al.* (2003).

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# ARE THE EFFECTS OF FISCAL CHANGES DIFFERENT IN TIMES OF CRISIS AND NON-CRISIS? THE FRENCH CASE

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## 1 Goal of the paper and motivation

This paper shows that the impact of changes in budgetary variables on real GDP, investment, consumption and employment varies in sign and magnitude in times of crisis and non-crisis. To this end, a regime-switching process is embedded in standard macroeconomic equations in order to take into account different budgetary regimes. Our purpose is threefold.

First, we aim at reconsidering the non-monotonic effects of fiscal policy over the business cycle by distinguishing, on the one side periods of severe recessions or depressions (crises) and, on the other side, “normal” periods (expansions or moderate recessions). For illustration purpose, we consider the French case, since our study can help in judging the quantitative impact of the fiscal package (“plan de relance”) undertaken by the French fiscal authorities in 2008, considering both Keynesian and non-Keynesian effects may be observed at different times.

Secondly, we consider the nonlinear response of a variety of fiscal measures targeted to private consumption, business investment, private employment, in addition to the real GDP. Indeed, non-monotonic responses to fiscal changes are likely to be more precisely estimated if we consider the components of the GDP but not only the real GDP itself. The reason is that, the nonlinear response of the GDP to fiscal changes most of the time can be explained by the private sector’s behavior (because any policy modifies market confidence, expectations among the public about future outcome and accordingly the agents’ decisions).

Thirdly, and more importantly, we are searching for nonlinear fiscal impacts in the form of regime-switching effects. Doubts about the successfulness of the recent massive fiscal interventions in the world rely on the recognition that there are fiscal regimes and that the latter alternate in a stochastic way. Regime-switching approaches to modeling fiscal policy have been an important aspect of the theoretical literature in endogenous growth models. Fiscal policy regimes have been identified as Keynesian or Ricardian regimes, low debt-output or high debt-output regimes, passive and active regimes, etc.<sup>1</sup>

The key idea is that the economy is unstable – and unpredictable – in terms of its reaction to budgetary changes (that is stochastic changes over time in the multipliers) due to two features. The first feature is the time-varying nature of fiscal policy reaction functions. Fiscal interventions vary over time in terms of magnitude and in terms of the instrument used (tax or spending) according to governments’ policy objectives, to the macroeconomic environment and to the state of public finances (fiscal space).<sup>2</sup> Since changes in fiscal policy switch in stance and nature due to political

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<sup>1</sup> In a pioneering paper, Sutherland (1997) shows that high public debt during times of crisis may reverse the effects of fiscal policy in an exogenous stochastic growth model. Davig (2004) derives regime-switching macroeconomic equilibria from an endogenous growth model in which agents face a signal extraction problem on forthcoming fiscal policies. Minea and Villieu (2008) propose an endogenous growth model *à la* Barro which exhibit a regime-switching effect of fiscal deficits on economic growth, depending on public debt ratio.

<sup>2</sup> There are examples in the literature of regime-switching tests of fiscal behaviors (see Favero and Monacelli, 2005; Thams, 2006; and Claeys, 2008).

and economic circumstances, they are better understood by relating them to different regimes. The second feature is the changing nature of the cyclical response to fiscal changes because agents' reaction to budgetary policy depends upon elements that are not under the direct control of the governments themselves (liquidity constraints, adjustment costs, leverage effects, Barro-Ricardo effects, credit market imperfection, etc).

A common modeling approach, mainly empirical, usually used by researchers, consists in providing evidence of asymmetric effects of fiscal changes on the economy between regimes that are defined according to a prior belief by the researcher: expansion and recession phases in the business cycle, times of fiscal contractions and fiscal expansions, regimes of active and passive budgetary rules, large and persistent or small and non-persistent fiscal impulses, times of binding liquidity constraints and "good" times, etc. The models contain dummy variables that capture structural breaks or threshold functions allowing for a dependence of fiscal multipliers to the level of an exogenous variable (for instance public debt ratio).<sup>3</sup>

An alternative approach, mainly theoretical, relies on the simulations of general equilibrium-based models in which fiscal rules (determining spending, taxes, or debt) are governed by a two-state Markov chain variable and agents make a probabilistic inference regarding the future rule and state of the economy to take their decisions. These models are based on the assumption of asymmetric information between governments and the private sector (firms and households). The latter thus use Bayesian procedures to learn the regime generating the expected future variables on which they base their investment and consumption decisions (debt/output ratio, tax, or spending).<sup>4</sup>

This paper adopts the second approach. Since, we search to differentiate the budgetary effects on the macroeconomic variables between times of crisis and non-crisis, we can assume that the root cause of the differing fiscal effects is the high uncertainty facing the public and private sectors. Crises appear occasionally, suddenly, with no specific regularity; they are characterized by huge depressions that make them different from standard business cycle troughs. Further, their duration is not predictable. For governments, in such a context, fiscal policy requires more flexibility and decisions are influenced by the forecasts of the future state of the economy. Their belief can be represented by probabilities. For the private sector, profit- and consumption-maximizing decisions are influenced by fiscal policy and, as shown in the aforementioned papers, agents solve a signal extraction problem when the information on both the state of the economy and fiscal policy is incomplete and asymmetric. These decisions are well described in a probabilistic framework involving Markov-switching variables.

Though we adopt the Markov-switching framework to study the non-monotonic effects of fiscal policy in times of crisis and non-crisis, our approach differs from those of the previous papers in the literature in the sense that it is not theoretical. Instead, we add to the previous literature by considering econometric models. Simulations derived from micro-founded models provide us with qualitative features, which need to be completed with quantitative measures. We thus consider a set of reduced-form equations that can be derived from the Markov-switching general equilibrium models mentioned in footnote 1, and, we estimate them.

We estimate time-varying probability Markov-switching models (TVPMS) to see whether the effects of fiscal policy on the real economy vary in France between times of crisis and non-crisis. These two regimes are identified endogenously, so that we do not need to preliminary separate episodes of huge contractions and expansions of the business cycle. Further, we are able to identify the variables influencing the probability of a switch between regimes. We assume

<sup>3</sup> For typical examples, we refer the reader to Perotti (1999); Giavazzi *et al.* (2000 and 2005); Minea and Vilieu (2008); and Tagkalakis (2008).

<sup>4</sup> See Dotsey (1994); Ruge-Murcia (1995); Dotsey and Mao (1997); and Davig (2004).

temporary variations in the budgetary variables and focus our attention on the effectiveness of fiscal measures at stimulating aggregate demand and output in the short run. This seems realistic as during exceptionally severe crises governments' fiscal measures consist of temporary interventions and are centered on Keynesian demand management and fine-tuning of the business cycle. Prices and the exchange rate are thus assumed to be fixed and fiscal changes only cause aggregate demand variables to fluctuate.

We examine the effects of various types of taxes and various targets for government spending. A common wisdom for modeling the effects of shocks is to compute impulse response functions after "shocking" the non-systematic component (innovations) of the budgetary variables. Another way to proceed, used in this paper, consists in introducing a stochastic process in the coefficients of estimated equations where the parameters are regime-dependent and where the manner in which regime shifts occur is specified by a probability distribution function defining the probability of transition from either regime to another. In this type of models, changes in the budgetary variables are considered as intra-regime shocks. For instance, a typical question is: what is the short-run impact of a 1 per cent change in government spending on the output if the likelihood that the economy is in a crisis regime is high? In this alternative approach, the uncertainty is not due to the fact that shocks are unanticipated, but to the fact that even when they are expected, the current state of the economy is not observed *ex ante*.

Finally, we do not distinguish between the discretionary and non-discretionary changes in the fiscal variables, but consider the effects of changes in the budgetary variables taken as a whole. Indeed, the effectiveness of fiscal changes depends upon both discretionary stimulus and the size of automatic stabilizers.

The paper is structured as follows. Section 2 presents the estimated equations. Section 3 discusses the econometric methodology of time-varying transition Markov-switching models. Section 4 presents the results, while Section 5 elaborates on some policy implications. Finally, Section 6 concludes.

## 2 Benchmark equations

In this section we lay out the equations that are estimated to study the nonlinear effects of budgetary policies between times of crisis and non-crisis. We consider four endogenous variables: first, private GDP; second, private consumption; third, business investment and fourth, employment. Each variable is fairly standard in macroeconomic models, the difference here being that we want to see which circumstances are most likely to give rise to a non-monotonic response of these variables to budgetary changes, be they positive (expansionary fiscal policy) or negative (consolidations).

Our reduced-form equations are linearised versions of the solutions derived from the theoretical set-ups mentioned in footnote 1, which introduce Markov-switching stochastic processes in micro-founded models of the economic growth. One difference is however the nature of the regimes that we consider. Since the theoretical models often focus on fiscal regimes, the regimes are defined accordingly. For instance, Davig (2004) distinguishes between a low debt/output regime and a high debt/output regime. Dotsey (1994) makes a difference between a low tax regime and a high tax regime. Here, the regimes are those of crisis and non-crisis. We neither impose any *ex ante* restriction about what is called a "crisis", nor on the years when the latter occurs. We simply keep in mind that, usually, a crisis is characterized, first by severe depressions (drop of the output and of the main components of aggregate demand) and secondly by shifts in key macroeconomic and policy variables (public debt ratio, taxes and spending, output gap, credit demand, etc). Since, we do not know *ex ante* the regime ("crisis" or "non-crisis") generating the

observed changes in the real GDP, consumption, investment or employment, we assume that the agents make a probabilistic inference on their occurrence, regarding the state of some key macroeconomic and policy variables (called transition variables) which reflect the “circumstances” under which the economy is likely or not likely to switch from either regime to the other.

Since the Markov-switching models are defined under the assumptions that all our variables are stationary, we consider the first differences of the exogenous/endogenous variables and the transition variables alike.<sup>5</sup> Besides, since our intention is to study the regime-switching effects of fiscal policy, in our benchmark equations, we assume that the switching between regimes is only driven by the fiscal variables (in addition to the lagged terms of the endogenous variables). Our equations include lags on the endogenous variables in order to capture costs of adjustments or partial adjustment dynamic behaviors.

### 2.1 Real private GDP

From standard arguments, changes in real private GDP  $y_t$ , are explained by control variables, namely the variations in the degree of openness,  $open_t$ , the real short-term interest rate,  $i_t$ , and budgetary variables  $F_t$ :

$$\Delta y_t = \varphi_1(s_t) + \lambda(s_t)\Delta y_{t-1} + \varphi_2\Delta open_{t-i} + \varphi_3\Delta i_{t-j} + \varphi_4(s_t)\Delta F_t + \sigma_y \xi_t \quad (1)$$

$i, j$  (in indexes) are lags selected according to information criteria (AIC/BIC) and specification tests on the residuals (serial correlation and remaining nonlinearities).  $\Delta$  denotes first differences.  $\Delta F_t$  is a vector of contemporaneous and lagged changes of the budgetary variables.  $\xi_t$  is a stochastic disturbance with a variance  $\sigma_y$ . In our regressions, the best estimates (according to criteria described in the next section) were obtained when the growth rate or public debt or debt/GDP ratio were chosen as the transition variables.

### 2.2 Real private consumption

We estimate the following equation, whose dependent variable is the first difference of private real consumption:

$$\Delta c_t = \rho_0(s_t) + \rho_1(s_t)\Delta c_{t-1} + \rho_2\Delta w_t + \rho_3(s_t)\Delta transf_t + \sigma_c \vartheta_t \quad (2)$$

$\vartheta_t$  is an error term with a variance  $\sigma_c^2$ .  $w_t$  is a vector of contemporaneous and lagged values of households' real disposable income. Nominal income is defined as the sum of wages, households' other revenues (including financial revenues) and individual enterprises' EBITDA (earnings before interests, taxes, depreciation and amortization).  $transf_t$  is a vector of contemporaneous and lagged values of transfers. Nominal transfers are positive if they are paid to households (for instance, social payments) and negative if they are paid by households (for instance contribution to social security). The “best” transition variable in our regressions is changes in unemployment. This equation can be derived from a theoretical model where households aim at maximizing a utility function upon consumption and labor, for given values of their revenues, taxes and transfers. We assume that labor supply is inelastic to the real wages in a context of high unemployment rate.

<sup>5</sup> We applied unit root tests to our series, in a preliminary step, and concluded in favor of a rejection of the null of no unit root when they were in level. To avoid too many tables, the results are not reported but available upon request to authors.

### 2.3 Real business investment

We consider business investment and private employment equations that are assumed to be derived from profit maximization subject to a Cobb Douglass type production function with the inputs of capital and labor. We consider changes in firms' real investment rate,  $\Delta invest_t$ , as a function of contemporaneous and lagged changes in real GDP,  $\Delta y_t$ , in the real long-term interest rate,  $\Delta R_t$  (both variables are in the vector of control variables  $X_t$ ) and the following fiscal variables enter in the vector  $F_t$ : changes in corporate taxes, variations in subsidies and government spending.  $j$ ,  $k$  and  $l$  are lags determined by information criteria. The equation is the following:

$$\Delta invest_t = \theta_0(s_t) + \theta_1(s_t)invest_{t-1} + \theta_2\Delta X_t + \theta_4(s_t)\Delta F_t + \sigma_{inv}\omega_t \quad (3)$$

$\omega_t$  is an error term with a variance  $\sigma_{inv}$ ,  $\Delta X_t$  is the vector of contemporaneous and lagged changes of the control variables and  $\Delta F_t$  is the vector of contemporaneous and lagged changes of the budgetary variables. The transition variable is the output gap (a proxy for the capacity utilization level).

### 2.4 Employment

Changes in private employment,  $\Delta L_t$ , depend on the growth rate of current and past real GDP, represented by the vector  $\Delta [(RGDP)]_t$  (on the variations of the unit labor costs (ratio of unit wages to labor productivity  $(\Delta \frac{wages_{t-1}}{PROD_{t-1}})$ ). Adjustment costs are modeled by the lagged endogenous variable and we also consider public investment,  $INVEST_{t-j}$ .  $i$  and  $j$  are lags. Fiscal policy is assumed to influence two explanatory variables: on the one hand, the unit labor cost varies with, for instance, the employers' contribution to social security or taxes on labor demand; on the other hand, public investment is strongly correlated with government current expenditure and can be considered as an element of public demand. The transition variable is the variations of the output gap. The equation is the following:

$$\begin{aligned} ((\Delta L))_t = & \tilde{\varphi}_0(s_t) + \tilde{\varphi}_1(s_t)[(\Delta L)]_{t-1} + \tilde{\varphi}_2[(\Delta RGDP)]_t + \\ & + \tilde{\varphi}_3(s_t) \left[ \Delta \left( \frac{[(wages)]_{t-i}}{[(PROD)]_{t-i}} \right) \right] + \tilde{\varphi}_4(s_t)[(\Delta INVEST)]_{t-j} + \sigma_L \vartheta_t \end{aligned} \quad (4)$$

$\vartheta_t$  is the error term with a variance  $\sigma_L^2$ .

## 3 Time-varying probability Markov-switching models

### 3.1 Definition

We consider an endogenous variable  $y_t$  which "visits" two regimes, one corresponding to times of crisis and the other to "normal times". The occurrence of a regime is referred by a variable  $s_t$  that takes two values: 1 if the observed regime is 1 and 2 if it is regime 2.<sup>6</sup> We assume that  $t=1, \dots, T$ .

<sup>6</sup> We do not discuss here the question as whether the number of states is equal to or different from 2. This is an assumption in our case. However, several methodologies have been proposed to deal with the testing of the number of states to which we refer the interested reader (see, among others, Hamilton, 1991; Hansen, 1992; and García, 1998).

The observation of either regime 1 or 2 at time  $t$  depends upon the regimes visited by the endogenous variable during the previous periods, that is  $s_t$  is conditioned by  $s_{t-1}, s_{t-2}, \dots, s_{t-k}$ . At any time  $\tau < t$ , the regime that will be observed at time  $t$  is unknown with certainty. We thus introduce a probability  $P$  of occurrence of  $s_t$  given the past regime. Assuming, for purpose of simplicity, that  $s_t$  is a first-order Markov-switching process, we define:

$$P\left\{\frac{s_t}{s_{t-1}, s_{t-2}, \dots, s_{t-k}}\right\} = P\left\{\frac{s_t}{s_{t-1}}\right\} \quad (5)$$

We further assume that the transition from one regime to the other depends upon a set of “transition” variables described by a vector  $z_t$  so that:

$$P\left\{\frac{s_t}{s_{t-1}}\right\} = P\left\{\frac{s_t}{s_{t-1}}, z_t\right\} \quad (6)$$

The relation between  $z_t$  and  $s_t$  is given by:

$$s_t = \begin{cases} 1, & \text{if } \eta_t < a(s_{t-1}) + z_t' b(s_{t-1}) \\ 2, & \text{if } \eta_t \geq a(s_{t-1}) + z_t' b(s_{t-1}) \end{cases} \quad (7)$$

where  $\eta_t$  is distributed as a  $\Phi$  law. We accordingly define the transition probabilities as follows:

$$\begin{cases} P\left\{s_t = \frac{1}{s_{t-1} = j}, z_t\right\} = p_{1j}(z_t) = \Phi(a_j + z_t' b_j) \\ P\left\{s_t = \frac{2}{s_{t-1} = j}, z_t\right\} = p_{2j}(z_t) = 1 - \Phi(a_j + z_t' b_j) \end{cases} \quad (8)$$

where  $\Phi$  is either the standard Logistic or Normal cumulative distribution function.<sup>7</sup>

Since the dynamics of the endogenous variable is assumed to be regime-dependent, then any influence of explanatory variables, represented by a vector  $x_t$ , may differ across regimes. We thus consider the following relationship:

$$y_t = \begin{cases} x_t' \beta_1(s_t) + \sigma_1(s_t) \varepsilon_t, & \text{with a probability } p_1(z_t) \\ x_t' \beta_2(s_t) + \sigma_2(s_t) \varepsilon_t, & \text{with a probability } p_2(z_t) \end{cases} \quad (9)$$

where  $\varepsilon_t \sim N(0,1)$ .  $p_1(z_t)$  and  $p_2(z_t)$  are the posterior (or unconditional probabilities) of regimes 1 and 2. The usual probabilistic properties for the ergodicity and the invertibility of (9) applies if we assume that  $y_t$ ,  $x_t$  and  $z_t$  are covariance-stationary.

The above model can be generalized to a higher number of states (see Kim *et al.*, 2008) and encompasses several classes of Markov-switching models previously proposed in the literature (Goldfeld and Quandt, 1973; Diebold *et al.*, 1994; Filardo, 1994; and Hamilton, 1989).

<sup>7</sup> Any functional form of the transition probabilities that maps the transition variables into the unit interval would be a valid choice for a well-defined log-likelihood function: logistic or Probit family of functional forms, Cauchy integral, piecewise continuously differentiable variables. The choice of a Logistic and Normal law is common wisdom in the applied literature.

### 3.2 Estimation and methodological issues

The above model is estimated via maximum likelihood (henceforth ML) with relative minor modifications to the nonlinear iterative filter proposed by Hamilton (1989). We define the following vectors:  $\Omega_t = (x_t, z_t)$  the vector of observations of  $x$  and  $z$  up to period  $t$ ;  $\xi_t = (y_t, y_{t-1}, \dots, y_1)$ ;  $\theta_t = (\beta_1, \sigma_1, a_1, b_1, \beta_2, \sigma_2, a_2, b_2)$ .

The conditional likelihood function of the observed data  $\xi_t$  is defined as:

$$L(\theta) = \prod_{t=1}^T f\left(\frac{y_t}{\Omega_t}, \xi_{t-1}; \theta\right) \quad (10)$$

$$f\left(\frac{y_t}{\Omega_t}, \xi_{t-1}; \theta\right) = \sum_i \sum_j f\left(\frac{y_t}{s_t} = i, s_{t-1} = j, \Omega_t, \xi_{t-1}; \theta\right)$$

where:

$$\times P\left(s_t = i, s_{t-1} = \frac{j}{\Omega_t}, \xi_{t-1}; \theta\right) \quad (11)$$

The weighting probability in (11) is computed recursively by applying Bayes's rule:

$$P\left(s_t = i, s_{t-1} = \frac{j}{\Omega_t}, \xi_{t-1}; \theta\right) = P\left(s_t = \frac{i}{s_{t-1}} = j, z_t\right) P\left(s_{t-1} = \frac{j}{\Omega_t}, \xi_{t-1}; \theta\right) = P_{ij}(z_t) P\left(s_{t-1} = \frac{j}{\Omega_t}, \xi_{t-1}; \theta\right) \quad (12)$$

We also have:

$$P\left(s_t = \frac{i}{\Omega_{t+1}}, \xi_t; \theta\right) = P\left(s_t = \frac{i}{\Omega_t}, \xi_t; \theta\right)$$

$$\frac{1}{f\left(\frac{y_t}{\Omega_t}, \xi_{t-1}; \theta\right)} \sum_j f\left(\frac{y_t}{s_t} = i, s_{t-1} = j, \Omega_t, \xi_{t-1}; \theta\right)$$

$$\times P\left(s_t = i, s_{t-1} = \frac{j}{\Omega_t}, \xi_{t-1}; \theta\right) \quad (13)$$

To complete the recursion defined by the equations (11) and (12), we need the regime-dependent conditional density functions:

$$f\left(\frac{y_t}{s_t} = 1, s_{t-1} = j, \Omega_t, \xi_{t-1}; \theta\right) = \frac{\Phi\left(\frac{y_t - x_t' \beta_1}{\sigma_1}\right) \Phi(a_j + z_t' b_j)}{\sigma_1 P_{1j}(z_t)} \quad (14a)$$

$$f\left(\frac{y_t}{s_t} = 2, s_{t-1} = j, \Omega_t, \xi_{t-1}; \theta\right) = \frac{\Phi\left(\frac{y_t - x_t' \beta_2}{\sigma_2}\right) \Phi(a_j + z_t' b_j)}{\sigma_2 P_{2j}(z_t)} \quad (14b)$$

The parameters of equations (8) and (9) are thus jointly estimated with ML methods for mixtures of Gaussian distributions. As compared with other estimators (for instance, the EM algorithm or the Gibbs sampler),<sup>8</sup> the ML estimator has the advantage of computational ease. As shown by Kiefer (1978), if the errors are distributed as a normal law, then the ML yields consistent and asymptotically efficient estimates. Further, the inverse of the matrix of second partial derivatives of the likelihood function at the true parameter values is a consistent estimate of the asymptotic variance-covariance matrix of the parameter values.

The influence of  $z_t$  on  $P_{1j}$  and  $P_{2j}$  gives information about the way the transition variables influence the probability of being in either regime or another. For instance, if regime 1 is the crisis regime, a positive (resp. negative value) of  $b_1$  (resp.  $b_2$ ) implies that the transition variable raises the probability of evolving in a time of crisis.

The optimal combination of the lags on the control and transition variables is determined by computing information criteria (Akaike and Schwarz) for each estimated model. To assess the fit of the estimated models to the data, we apply Ljung-Box tests to the expected standardized residuals as well as tests of remaining non-linearities (Hinich and Patterson's, 1989) Portmanteau bispectrum test and Tsay's 1996 test). The expected residuals are the weighted residuals with the weights equal to the probability of observing regimes 1 and 2 at each date.

## 4 Data and results

We apply the model to France. Data are quarterly, span the years from 1970 to 2009, and are taken from the OECD database. Time series for public finance variables were available at a yearly frequency and were interpolated to get quarterly observations. In order to avoid spurious dynamics stemming from the interpolation method, we simply estimate a "trend" between two observations. Except when their values are negative, the data are transformed into logarithm. Further, we take the first differences to cope with non-stationarity (unit root tests, available upon request to the authors, showed that the data contain a stochastic trend). We select the best estimated equations according to the information criteria (AIC/BIC), the inexistence of serial correlation in the residuals, the likelihood ratio test for TVPMS (the null hypothesis is constant probabilities). For each model, the initial values are those of a linear regression of the endogenous variables on the control and fiscal variables.

To avoid endogeneity biases due to the correlation between the endogenous variables budgetary variables, we use a two-step approach by first estimating a VAR system in level composed of the variables of the different equations.<sup>9</sup> Then, in a second step, we consider the forecasted in-sample values of the explanatory variables to apply the TVPMS model. As the second stage is linear in the variables, the two-step approach is applicable.

### 4.1 Real private GDP equation

Table 1a through 1c report the estimates obtained for the GDP equation. All the variables are expressed in real terms (they are deflated by the GDP deflator). The transition variable is the fourth-order moving average of the differentiated logarithmic real debt or debt ratio. The model detects two regimes corresponding respectively to periods of crisis (huge troughs in the real GDP cycle) and "normal periods" (expansions or moderate recessions). The model improves over a

<sup>8</sup> See Diebold *et al.* (1994) and Filardo and Gordon (1993).

<sup>9</sup> By applying a Johansen test, we checked that the variables were cointegrated in levels.



Figure 1

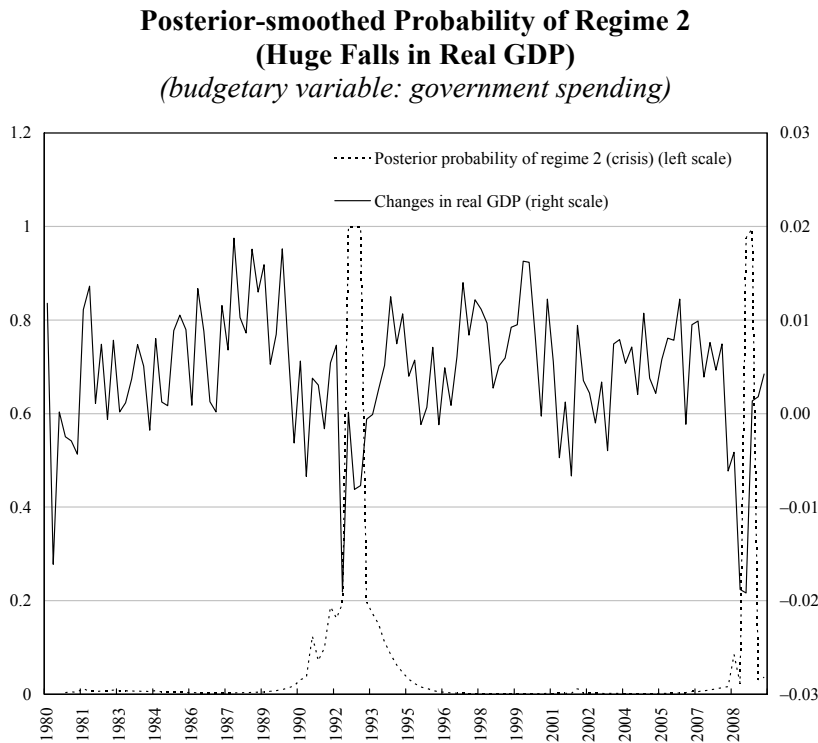
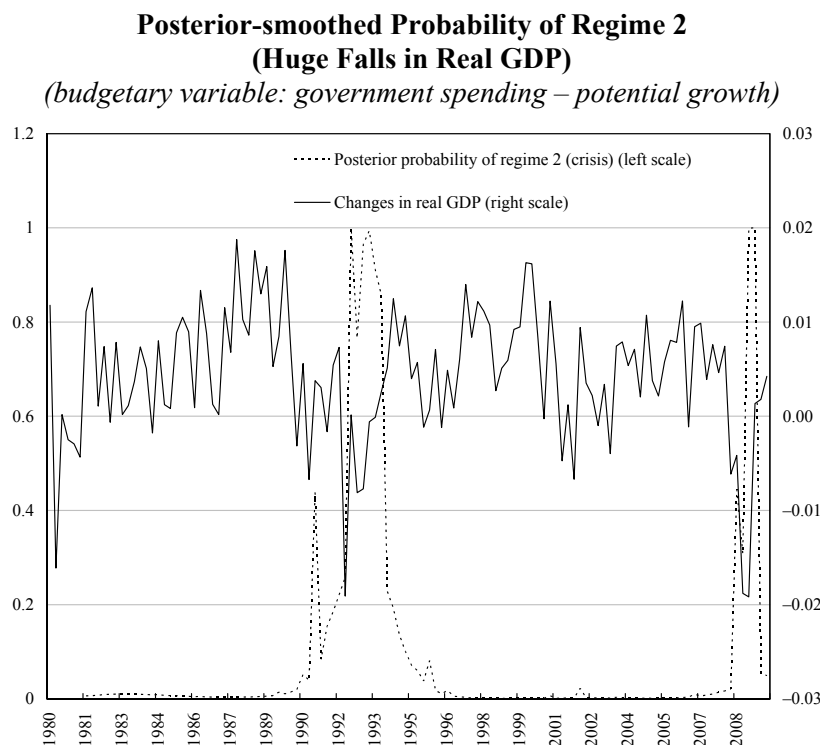


Figure 2



simple constant probability model *à la* Hamilton. Indeed, the likelihood ratio test for TVPMS is significant (the  $p$ -value lies under 5 per cent), thereby indicating a rejection of the hypothesis of constant transition probabilities. Figures 1 through 3 report the smoothed posterior probabilities of either regime 1 or 2 and we see that the smoothed probabilities approach 1 for the two years corresponding to the troughs of 1992/1993 and 2009. The model thus dichotomizes between a regime of crisis (regime 2) and a regime of non-crisis (regime 1). This is shown in Table 1a by the intercepts that are respectively negative ( $-0.013$ ) and positive ( $0.005$ ) in each regime. These intercepts capture the average GDP growth within each regime.

In Table 1a, evidence of an asymmetric effect of public expenditure is assessed by two different coefficients for regimes 1 and 2. Although both regimes are Keynesian (the estimated coefficients are positive), the impact of changes in government spending on the real GDP is higher when the economy is in crisis (regime 2) with a differing effect of 13 per cent (in comparison with regime 1). An increase in

public expenditure is therefore efficient to boost real GDP growth, in both times of crisis and non-crisis even though the impact is superior during crises. The control variables have the expected signs. A higher degree of openness increases the real private GDP, while a rise in the real short-term interest rate reduces it (though the latter does not appear to be statistically significant).

Changes in public debt across a year appeared to be the best transition variable (according to various criteria: residual tests, AIC/BIC criteria, remaining non-linearities tests). This variable

provides information on the fact that any increase in the stock of debt may be interpreted by the private sector as a phenomenon paving the way to possible solvability and sustainability problems in the future. This can decrease the “performance” of the expenditure multiplier if the expectations yield Ricardian behaviors (people save the additional revenues stemming from the new expenditure to pay the future taxes). In terms of our econometric model, the probability of being in a “strong” multiplier regime (regime 2) should decrease if Ricardian behaviors are at work. In this case, we would expect a negative sign of the coefficient  $b_2$  (and a positive sign of  $b_1$ ) in equation (8). As is seen in Table 3, this is not the case.

On the other hand, a positive growth rate of the stock of debt implies a higher volume of expenditure, which could raise the magnitude of the impact on the real GDP if private investment and consumption fully and positively respond to public spending. In this case, we would instead expect a positive value of the coefficient  $b_2$  and a negative value of  $b_1$  (with at least one of both coefficients being statistically significant). To say it another way, a rise in public debt lowers the probability of being in regime 1, a regime in which public expenditure have the less significant impact on real GDP growth. This is the case here, as evidenced by the estimated coefficients. This would mean that, in France, there seems not to be Ricardian effects associated with an increase in the stock of debt. Such anti-Keynesian effects do not appear when we consider the aggregate real GDP. Instead, during the crisis regimes, increasing debt provides a fiscal space that reinforces the effects of government spending on the real GDP.

We further consider the difference between the growth rate of government expenditure and that of potential output, as an explanatory fiscal variable (instead of changes in government spending). The idea is that in the medium term, a large part of public expenditure is supposed to change according to potential GDP growth (in this case expenditure ratio to GDP remains

**Figure 3**

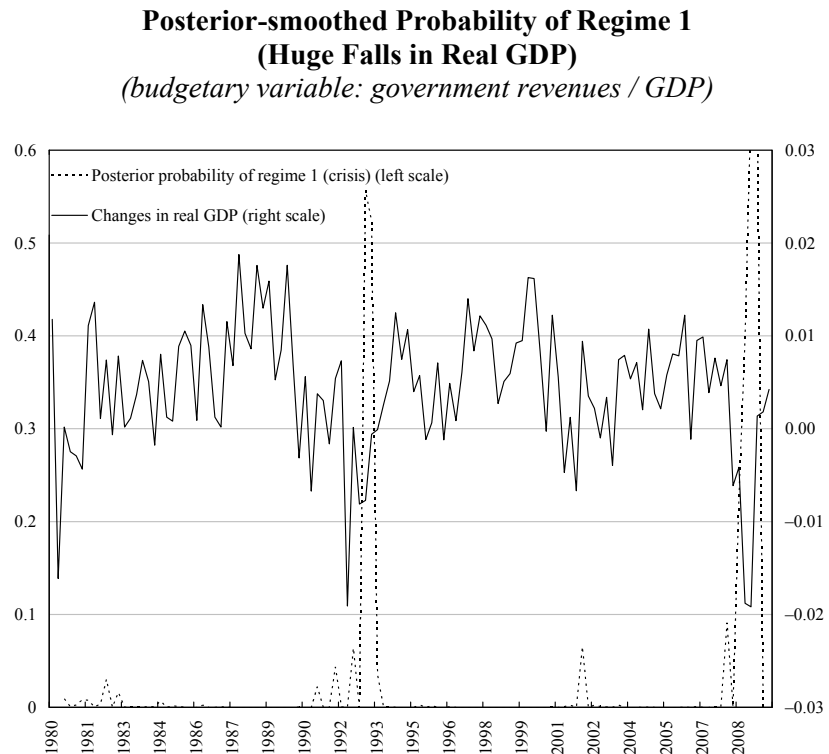


Table 1a

**Real GDP – TVPMS Model for France, 1979:01-2009:04***(budgetary variable:  $\Delta$  government spending)*

Explanatory Variable	Coefficient	T-ratio	p-value
Intercept (regime 1)	0.005	2.26	0.023
Intercept (regime 2)	-0.013	-5.13	0.0
AR(1) coefficient (regime 1)	0.335	3.43	0.0
AR(1) coefficient (regime 2)	-0.196	-0.99	0.322
Residual standard error (regime 1)	0.005	14.60	0.0
Residual standard error (regime 2)	0.003	2.01	0.04
$\Delta$ government spending ( $t-2$ ) (regime 1)	0.248	2.753	0.005
$\Delta$ government spending ( $t-2$ ) (regime 2)	0.370	3.947	0.0
$\Delta$ degree of openness ( $t-1$ )	0.047	1.828	0.067
Real interest rate ( $t-1$ )	-0.0008	-1.019	0.308
Transition variable : $\Delta$ debt ( $t-1$ ) (smoothed)			
$a_1$	8.77	2.59	0.009
$a_2$	-1.35	-0.25	0.799
$b_1$	-255.18	-1.847	0.064
$b_2$	67.44	0.322	0.746
Likelihood ratio test for TVPMS (null hypothesis: constant probabilities) Chi-squared(2): 8.834 with significance level 0.01206			
<p>Tests on residuals</p> <p>Ljung-Box statistics (autocorrelation of order k): LB(k)            LB(1): 1.134 significance level: 0.286            LB(2): 1.552 significance level: 0.46            LB(3): 1.568 significance level: 0.666</p> <p>Linearity tests            Hinich bispectral test (statistics and p-value): -3.285 0.99            Tsay test (statistics and p-value): 2.917 0.001</p>			

constant). Then, a positive difference reflects a discretionary budgetary expansion, while a negative difference means an active fiscal consolidation.

Table 1b lists the estimates corresponding to this case. Again regimes 1 and 2 are respectively classified into “non-crisis” and “crisis” phases (see also Figure 2). However, the above conclusions change. Indeed, if we consider the effects of discretionary public spending (and not the combined effects of the discretionary and automatic stabilizers components of government expenditure, as is the case in Table 1a) the estimates suggest a non-monotonic effect of government spending with a positive and significant impact of the real GDP during crises, but no impact during non-crisis periods. An explanation may be the following. During crises, liquidity constraints are important and reinforce the impact of government expenditure on the activity. During non-crisis periods, crowding-out effects (a decreased in private investment due to the fact that government spending use up resources that would be available otherwise to the private sector) moderate the positive impact of the discretionary policy (this is confirmed further by the estimation of our investment equation). Another point that appears in Table 1b is that the delays of transmission of public spending to the activity differ whether we consider only the discretionary component of public spending or public expenditure as a whole. In the first case, the transmission to the activity takes a longer time (the optimal lag for the government spending variable is 5 in Table 1b, while it is 2 in Table 1a).

Table 1c shows estimates when the budgetary variable is the ratio of government revenues to GDP. The estimates are consistent with two different regimes characterized respectively by huge falls of real GDP (regime 1) and increases or moderate decreases in real GDP (regime 2) – see also Figure 3. The fiscal effect on GDP is statistically null in the second regime, but negative and statistically significant in the first. Accordingly, raising fiscal revenues is not harmful for the economy in times of “non-crisis”, but may reduce production when the economy evolves in a crisis phase. Conversely, tax cuts can help to exit from a depression. How can we explain the asymmetric effect of tax revenues of the real GDP? Tax revenues affect production indirectly through their impact on aggregate expenditure (because they involve changes in disposable income, the cost of factors, wealth, etc). If the government reduces taxes with the goal of warding off a huge recession or depression, the increased disposable income of the private sector will be partly consumed and partly saved depending upon the propensity to consume, invest, import, etc. If these propensities are higher in times of crisis as compared with times of non-crisis (due for instance to liquidity constraints), then we can expect a stronger impact when the economy is evolving in a huge trough of the business cycle.

The control variables have the expected signs, respectively positive for the degree of openness and negative for the real short-run interest rate (though the latter does not carry a statistically significant sign).

#### 4.2 *Real private consumption*

Table 2 shows the results for real private consumption when the unemployment rate is the transition variable. The theoretical literature points that, among the circumstances in which consumption may respond non-monotonically to fiscal variables, the uncertainty about the state of the economy is an important factor.

In France, we *do not* find any non-monotonic effect of fiscal policy on real private consumption between regimes of strong falls in consumption (crisis) and regimes of non-crisis, be the instruments taxes on income or social security transfers. The regimes identified by the model are plotted in Figures 4a and 4b. We see that the first regime is described as one in which consumption evolves in a trough. As indicated by the coefficients in Table 2, income taxes have no

Table 1b

**Real GDP – TVPMS Model for France, 1979:01-2009:04***(budgetary variable:  $\Delta$  spendgap =  $\Delta$  government spending –  $\Delta$  potential output)*

Explanatory Variable	Coefficient	T-ratio	p-value
Intercept (regime 1)	0.004	2.424	0.015
Intercept (regime 2)	-0.009	-3.823	0.0001
AR(1) coefficient (regime 1)	0.148	1.422	0.155
AR(1) coefficient (regime 2)	-0.177	-0.654	0.512
Residual standard error (regime 1)	0.005	14.16	0.0
Residual standard error (regime 2)	0.004	3.45	0.0
$\Delta$ spendgap ( $t-5$ ) (regime 1)	0.05	1.01	0.31
$\Delta$ spendgap ( $t-5$ ) (regime 2)	0.296	2.45	0.014
$\Delta$ degree of openness ( $t-1$ )	0.073	3.025	0.002
Real interest rate ( $t-1$ )	0.0005	0.570	0.568
Transition variable : $\Delta$ debt ( $t-2$ ) (smoothed)			
$a_1$	8.62	2.62	0.008
$a_2$	0.316	0.068	0.945
$b_1$	-270.62	-1.843	0.065
$b_2$	26.23	0.134	0.893
Likelihood ratio test for TVPMS (null hypothesis: constant probabilities) Chi-squared(2): 5.331 with significance level 0.0695			
<p>Tests on residuals</p> <p>Ljung-Box statistics (autocorrelation of order k): LB(k)            LB(1): 1.474 significance level: 0.224            LB(2): 2.492 significance level: 0.287            LB(3): 4.116 significance level: 0.249</p> <p>Linearity tests</p> <p>Hinich bispectral test (statistics and p-value): 2.429 0.0075            Tsay test (statistics and p-value): 0.983 0.476</p>			

Table 1c

**Real GDP – TVPMS Model for France, 1979:01-2009:04***(budgetary variable:  $\Delta$  (Government revenues / GDP))*

Explanatory Variable	Coefficient	T-ratio	p-value
Intercept (regime 1)	-0.010	-3.272	0.001
Intercept (regime 2)	0.006	3.345	0.0008
AR(1) coefficient (regime 1)	0.0209	0.069	0.944
AR(1) coefficient (regime 2)	0.186	2.11	0.034
Residual standard error	0.005	14.957	0.0
$\Delta$ government revenues/GDP ( $t-1$ ) (regime 1)	-0.257	-2.19	0.027
$\Delta$ government revenues/GDP ( $t-1$ ) (regime 2)	-0.044	-1.032	0.302
$\Delta$ degree of openness ( $t-1$ )	0.058	2.293	0.021
Real interest rate ( $t-1$ )	-0.0008	-0.922	0.356
Transition variable : $\Delta$ debt ratio ( $t-1$ )			
$a_1$	1.019	0.759	0.44
$a_2$	5.743	3.798	0.0001
$b_1$	-24.47	-0.777	0.436
$b_2$	-111.11	-2.511	0.012
Likelihood ratio test for TVPMS (null hypothesis: constant probabilities) Chi-squared(2): 6.278 with significance level 0.043			
<p>Tests on residuals</p> <p>Ljung-Box statistics (autocorrelation of order k): LB(k)</p> <p>LB(1): 1.093 significance level: 0.295</p> <p>LB(2): 3.001 significance level: 0.222</p> <p>LB(3): 4.35 significance level: 0.226</p> <p>Linearity tests</p> <p>Hinich bispectral test (statistics and p-value): -0.343 0.634</p> <p>Tsay test (statistics and p-value): 2.04 0.021</p>			

Table 2

## Real Private Consumption – TVPMS Model for France, 1970:01-2009:04

Explanatory Variable	Coefficient	T-ratio	p-value
Intercept (regime 1)	0.00031	0.348	0.727
Intercept (regime 2)	0.006	5.986	0.0
AR(1) coefficient (regime 1)	0.027	0.164	0.869
AR(1) coefficient (regime 2)	-0.243	-2.08	0.037
Residual standard error	0.003	10.41	0.0
$\Delta$ income taxes(t) (regime 1)	-0.0068	-0.300	0.763
$\Delta$ income taxes(t) (regime 2)	0.044	1.369	0.170
$\Delta$ transfers (t-1) (regime 1)	0.149	2.319	0.02
$\Delta$ transfers (t-1) (regime 2)	0.142	1.768	0.076
$\Delta$ social security(t) (regime 1)	-0.113	-1.919	0.054
$\Delta$ social security(t) (regime 2)	-0.02	-0.401	0.688
$\Delta$ real disposable income	0.139	2.158	0.03
Transition variable: unemployment rate (smoothed)			
$a_1$	-0.234	-0.354	0.723
$a_2$	1.319	2.02	0.043
$b_1$	163.83	2.793	0.0052
$b_2$	-22.97	-0.543	0.586
Likelihood ratio test for TVPMS (null hypothesis: constant probabilities)			
Chi-squared(2): 8.238 with significance level 0.0162			
Tests on residuals			
Ljung-Box statistics (autocorrelation of order k): LB(k)			
LB(1): 0.244 significance level: 0.62			
LB(2): 1.695 significance level: 0.428			
LB(3): 1.805 significance level: 0.613			
Linearity tests			
Hinich bispectral test (statistics and p-value): -1.968 0.975			
Tsay test (statistics and p-value): 2.079 0.019			

effects on real private consumption while the effects of transfers appear to be symmetric as we find a coefficient of quite similar size for both crisis and non-crisis regimes (around 0.14). Only the contributions to social security are associated with an asymmetric impact on consumption with a negative outcome only during times of crises.

The probability of being in a crisis regime increases with the unemployment rate, as expected ( $b_1$  carries a positive sign). Finally, the real disposable income positively influences private consumption.

To summarize, only spending increases in the form of transfers to households raise the real private consumption (we have a Keynesian outcome for this variable), but the impact is symmetric. The finding that taxes have no significant effects on consumption can be interpreted with reference to several approaches of the economic literature. For instance, if we consider the effect of tax cuts, we can think that, during crises, there are non-Keynesian effects due to precautionary saving (as the unemployment rate increases) that offset the positive effect on

Figure 4a

### Posterior-smoothed Probability of Regime 1 (Huge Falls in Private Consumption)

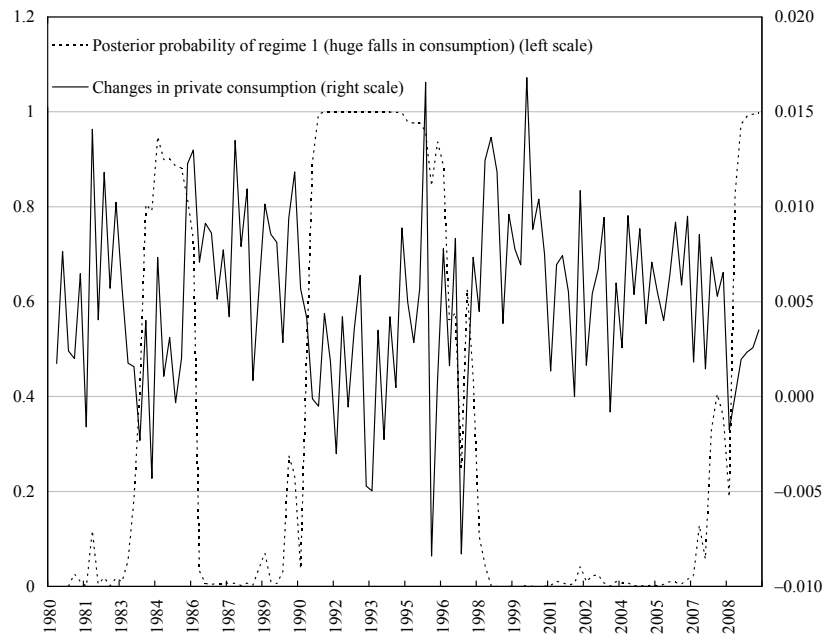
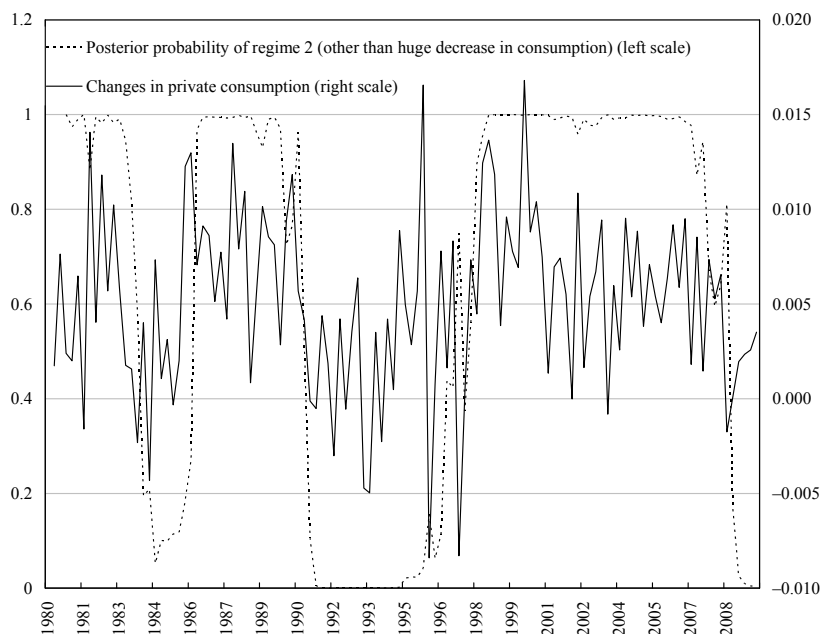


Figure 4b

### Posterior-smoothed Probability of Regime 2 (Other Periods than Huge Falls in Private Consumption)





consumption. The size of precautionary saving may be more or less important depending upon whether households face strong liquidity constraints or not. Tax cuts are “consumed” if households are highly constrained (a situation observed during crises) and saved otherwise. This can explain why we obtain a negative sign for the income tax variable in the regime of crisis ( $-0.0068$ ), but a positive one for the non-crisis regime ( $0.044$ ). It is possible that the unemployment rate (which is our transition variable) determines whether households take or not their decision of consumption expenditure (in response to a tax decrease or increase) regarding their perceived permanent disposable income. When the unemployment is growing moderately or is decreasing (non-crisis regime), households are more inclined to smooth consumption in comparison with a situation in which the unemployment rate is increasing fast (as is observed in a crisis regime). In the latter case, consumption is constrained by their current income and this reduces the effect of precautionary saving.

#### *4.3 Business investment*

The estimates for business investment are reported in Table 3 and the smoothed posterior probabilities of being in either a regime of sustained increases in investment (regime 1) or in a regime of prolonged decreased (regime 2) are shown in Figures 5a and 5b. As seen in Figure 5a, the probability of the second regime “jumps” to 1 around some years that are generally considered as being times of crisis or important recessions : second oil price shock years, the year 1983 which was characterized by a restrictive budgetary policy, 1993, 2001-02 and, as expected, 2009. Conversely, in Figure 5a, we observe that the probability of being in regime 1 increases during the times when business evolves on an ascending trend. The outcome of cuts in corporate taxes is an increase in investment in times of booming investment (regime 1). We indeed obtain a statistically significant coefficient of  $-0.08$ . Conversely, to mitigate an investment downturn, the instrument of direct tax does not prove efficient as the coefficient is statistically not different from 0 at the 5 per cent level of significance. One reason may be that, during the phases of a depressed activity, firms are more sensitive to demand-side variables than to fiscal discretionary measures.

Our results also point to a significant crowding-out effect of government spending on business investment only in times of booming investment (regime 1) (the coefficient is around  $-0.39$ ). As is known from theory, there are several channels at play here. The reduction in business investment may occur because the spending is accompanied by a tax increase. As, we have just seen, any increase in corporate taxes does not have a significant impact on firms’ investment behavior periods of booming investment (regime 1). Another mechanism is a reduction in private investment following a higher government borrowing. We tried to use the debt ratio as a transition variable to see whether this variable influences the reaction of business investment to government spending, but it appears not to be conclusive in explaining the asymmetries observed in the data. Crowding-out effects appears to be moderate during recessions or depressions (here non-significant in regime 2) because government spending expands the demand facing the private sector (through the multiplier) thereby implying an accelerator effect that is strong when firms suffers from unused capacities (stronger during the crises than during expansions). In the regression, we can see that the coefficients related to the impact of the real GDP are big in comparison to the others (the coefficients of lagged GDP terms sum to 1.56).

Government subsidies also appear to have an asymmetric impact on business investment with possible non-Keynesian effects in the second regime (crisis). The subsidies do not influence private investment during expansion phases – the coefficient is not statistically significant in regime 1 – but reduce it during recessions. One explanation can be that, during recessions, in addition to reducing capacities, firms also proceed to other internal adjustments (for instance, they deleverage to clean up their balance sheets or reduce their debts).

Turning our attention to the impact of the control variables, we see that the real GDP has an expected positive influence, while the real long-run interest rate acts negatively.

The diagnostic tests show that, while there are no residual correlations (the  $p$ -value of the Ljung-Box statistics are above 5 per cent), the residuals still contain remaining nonlinearities (both the Hinich and Tsay tests reject the null hypothesis of linearity). Accordingly, the investment behavior may obey to other type of nonlinearities.<sup>10</sup>

#### 4.4 Private employment

We now consider the asymmetric impact of unit labor costs and public investment on private employment. The different ways the enterprises respond to the increase in public demand can lead to asymmetric reactions of private employment to changes in public investment. On the one hand, if, in response to higher total demand, they extend their existing capacity level with the same technology, this leads an upward shift of labor demand. On the

Figure 5a

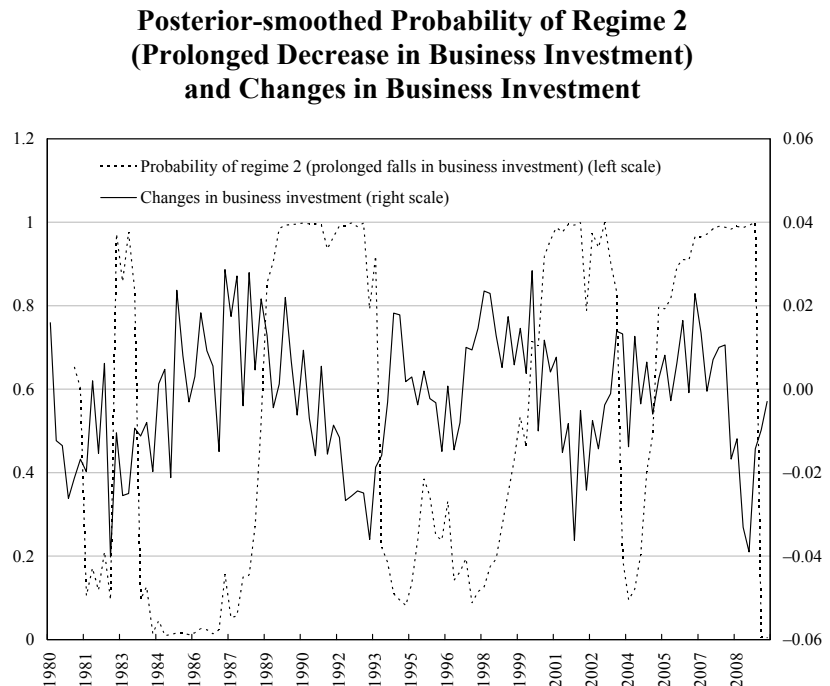
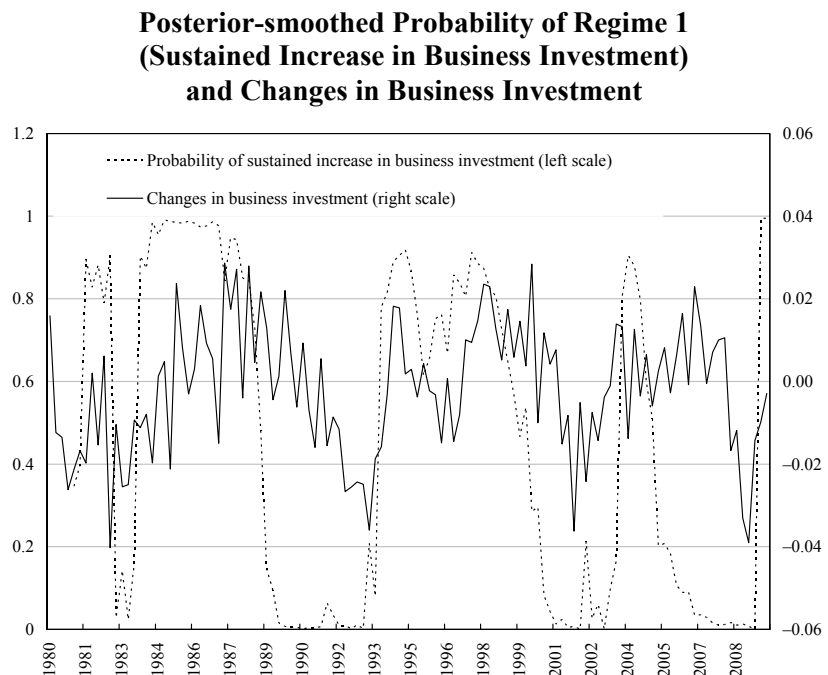


Figure 5b



<sup>10</sup> For instance, since this variable is more volatile than the other components of total demand, nonlinearities may exist in the variance. However, considering these nonlinearities here would make the model cumbersome to estimate).

Table 3

**Business Investment – TVPMS Model for France, 1970:01-2009:04**

Explanatory Variable	Coefficient	T-ratio	p-value
Intercept (regime 1)	0.008	2.55	0.01
Intercept (regime 2)	-0.003	-0.77	0.438
AR(1) coefficient (regime 1)	0.012	0.11	0.905
AR(1) coefficient (regime 2)	0.276	2.57	0.01
Residual standard error	0.01	14.57	0.0
$\Delta$ corporate taxes ( $t-3$ ) (regime 1)	-0.08	-2.21	0.027
$\Delta$ corporate taxes ( $t-3$ ) (regime 2)	0.022	0.76	0.442
$\Delta$ subsidies ( $t-2$ ) (regime 1)	0.048	1.27	0.201
$\Delta$ subsidies ( $t-2$ ) (regime 2)	-0.17	-3.04	0.0023
$\Delta$ government spending ( $t-3$ ) (regime 1)	-0.394	-2.422	0.015
$\Delta$ government spending ( $t-3$ ) (regime 2)	-0.357	-1.16	0.244
$\Delta$ real GDP ( $t-2$ )	0.430	1.928	0.053
$\Delta$ real GDP ( $t-3$ )	1.13	5.25	0.0
Real long-run interest rate ( $t-2$ )	-0.001	-3.38	0.0
Transition variable: output gap			
$a_1$	2.07	2.73	0.006
$a_2$	2.59	3.80	0.0
$b_1$	-1.063	-1.52	0.127
$b_2$	1.036	2.58	0.009
Likelihood ratio test for TVPMS (null hypothesis: constant probabilities) Chi-squared(2): 9.524 with significance level 0.0085			
<p>Tests on residuals</p> <p>Ljung-Box statistics (autocorrelation of order k): LB(k)</p> <p>LB(1): 0.212 significance level: 0.644</p> <p>LB(2): 5.532 significance level: 0.063</p> <p>LB(3): 5.716 significance level: 0.126</p> <p>Linearity tests</p> <p>Hinich bispectral test (statistics and p-value): -3.313 0.99</p> <p>Tsay test (statistics and p-value): 2.624 0.0029</p>			

other hand, if the additional investments incorporate labor saving technology, this leads negative employment effects. The positive demand-side effects are, in general, the result of higher expected profits. These are likely to occur during crises if, for instance, firms are facing strong liquidity constraints. Conversely, enterprises can choose to take advantages of the productivity gains associated with booms or expansions and accordingly to save labor.

A fall in unit labor costs (measured by the ratio of unit wages to total productivity) can lead to an increase in employment as long as labor demand is sensitive to these costs. In our estimations, reported in Table 4, we retrieve these different effects.

Figure 6 shows that the posterior probability of being in regime 1 is around 1 for the years that are usually identified as years of crises (for instance the 2009 crisis, 1992-93 or the years following the two oil price shocks of the seventies and eighties). The estimated autoregressive coefficients, in Table 4, accord well with the fact that episodes of huge negative variations in private employment occur much more rarely than those of moderate diminutions or increases. The latter are more frequently observed so that the corresponding state is very persistent.

In the second regime (non-crisis), a decrease in unit labor costs comes along with an increase in private employment (the negative coefficient,  $-0.12$ , indicates a negative relationship between the two variables), while during times of crisis a fall in unit labor costs is accompanied by decreases in labor demand (as illustrated by the positive coefficient,  $0.03$ ). This findings reflects the inability of downward pressure in the cost of labor to stimulate employment if, at the same time, total demand is decreasing importantly as is the case in times of crisis.

The results also show asymmetric effects as regards the impact of public investment. We find that any increase results in higher employment in times of crisis (the coefficient carries a positive sign of  $0.01$ ), but a fall in non-crisis times. It may be the case that public investment appears as “manna” to firms when they face outlet constraints and that they trade-off between labor and productivity in non-crisis times.

As regards the other coefficients, we find that the higher the value of the output gap (the higher the value of actual production above potential output), the less likely the probability of evolving in the first regime (crisis), which accords with the fact that in the latter firms have many

**Figure 6**

**Posterior-smoothed Probability of Regime 1  
(Times of Crisis)**

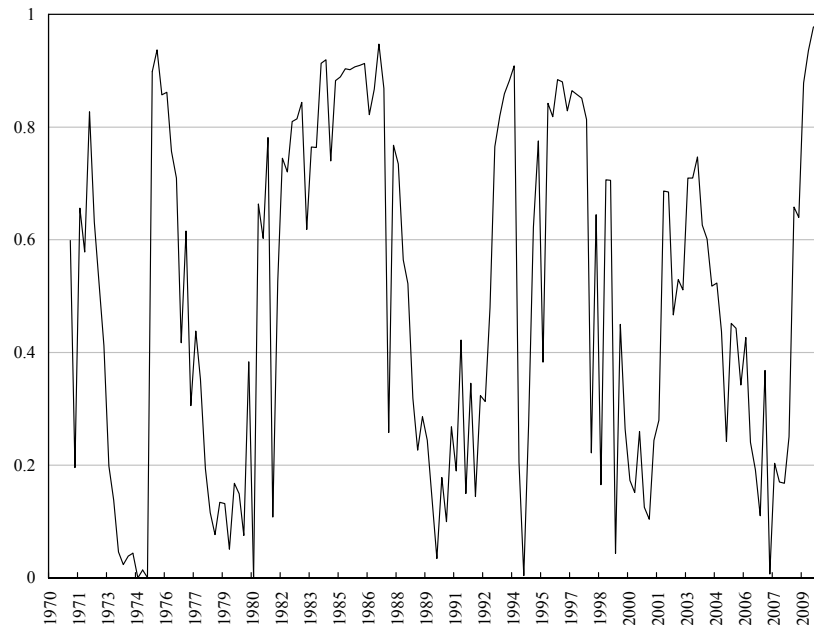


Table 4

## Private Employment – TVPMS Model for France, 1970:01-2009:04

Explanatory Variable	Coefficient	T-ratio	p-value
Intercept (regime 1)	-0.002	-4.91	0.0
Intercept (regime 2)	-0.0008	-2.83	0.004
AR(1) coefficient (regime 1)	0.579	13.76	0.0
AR(1) coefficient (regime 2)	1.144	11.83	0.0
Residual standard error (regime 1)	0.00078	11.90	0.0
Residual standard error (regime2)	0.00073	7.57	0.0
$\Delta$ unit labor cost ( $t-3$ ) (regime 1)	<b>0.033</b>	<b>4.19</b>	<b>0.0</b>
$\Delta$ unit labor cost ( $t-3$ ) (regime 2)	<b>-0.122</b>	<b>-8.38</b>	<b>0.0</b>
$\Delta$ public investment ( $t-3$ ) (regime 1)	<b>0.016</b>	<b>3.25</b>	<b>0.001</b>
$\Delta$ public investment ( $t-3$ ) (regime 2)	<b>-0.028</b>	<b>-3.64</b>	<b>0.0002</b>
$\Delta$ real GDP ( $t-1$ )	0.10	6.68	0.0
Transition variable : output gap			
$a_1$	0.916	2.00	0.044
$a_2$	-0.741	-1.40	0.161
$b_1$	-0.829	-2.134	0.032
$b_2$	0.132	0.523	0.60
Likelihood ratio test for TVPMS (null hypothesis: constant probabilities) Chi-squared(2): 5.766 with significance level 0.0559			
Tests on residuals			
Ljung-Box statistics (autocorrelation of order k): LB(k)			
LB(1): 2.366 significance level: 0.123			
LB(2): 2.416 significance level: 0.298			
LB(3): 3.907 significance level: 0.27			
Linearity tests			
Hinich bispectral test (statistics and p-value): 1.621 0.0525			
Tsay test (statistics and p-value): 2.053 0.0182			

unused capacities ( $b_1$  is negative and statistically significant). The coefficient of the real GDP carries the expected positive sign.

## 5 Policy implications

The French recovery plan in the aftermath of the crisis was driven by some reductions in taxes and by a raise of public expenditure. Government spending increases accounts for the lion's share of this plan, so that we can say that it was mainly spending-oriented. However, beyond the crisis fiscal sustainability objectives will come back into the policymakers' agenda. This raises several important questions. Do we have reason to doubt the effectiveness of the standard Keynesian policy, as suggested by some economists? Do we observe nonlinear effects in the response of real GDP, private consumption, investment and employment to changes in taxes or spending (for instance, is the response of the economy likely to be weaker or higher during the crisis to a fiscal stimulus, than during the exit-crisis period)? To what extent will it be possible to conciliate both objectives of achieving fiscal sustainability and sustaining economic growth beyond the crisis?

These questions are important because France should begin a process of major fiscal adjustment (4 points off the cyclically-adjusted balance over a period of 3 years are enrolled in the revised stability program presented in January 2010). A central issue is whether such adjustment may have a relatively limited negative effect on growth. Our model can help to shed new light on this point by showing two distinct regimes associated with multipliers with different value or even sign.

What can we conclude about the effects of budgetary variables on the real GDP in France? First, there is evidence of asymmetric effects for both the multiplier of government expenditure and the fiscal multiplier, with differing effects during the phases of crisis and non-crisis. The following table summarizes our findings regarding the impact of the budgetary variables.

In light of the recent crisis, our results show that using the expenditure as the main instrument of the budgetary policy in order to cope with the drop of the real GDP and the employment rate was probably a better choice than a policy favoring recovery through fiscal cuts. Though tax cuts reduce the risk of a depression by raising the real GDP, the spending multiplier is larger than the one associated with tax cuts. Further, if we consider fiscal stimulus aimed at consumers and enterprises, a decrease in the direct taxes (corporate taxes or income taxes) is likely not to raise either consumption or private investment in times of crises. For reasons explained earlier, the propensity to spend out of such taxes may be offset by non-Keynesian effects. In the current juncture, transfers to households may help to support consumption which has the greatest contribution to GDP. However, direct subsidies to enterprises, in the current environment may not help due to the sharp fall in demand and the uncertainty facing the firms about how good the economic will be in the future (this explains the negative sign associated with the variable reflecting changes in subsidies).

Our estimates take into account the fact that the reactions of the economy to fiscal measures can be influenced by the growth rate of government debt. Ricardian behaviors are likely to affect the magnitude of the fiscal multiplier only and this explains why we find a higher value for the multiplier of expenditure in comparison with that of fiscal. This means that the budgetary instrument used to influence the economy during crisis and non-crisis is not neutral in terms of the probability of being in either regime or the other. Should a government cut taxes, while increasing its indebtedness, that this strategy would be interpreted as signaling future tax increases, thereby implying a higher likelihood of driving the economy out of an expansion phase. In contrast, in presence of a crisis, raising the expenditure while borrowing more might be interpreted as a way of

Table 5

**Effects of Budgetary Variables**  
(times of crisis and non-crisis)

	Non-crisis Regime		Crisis Regime	
	Coefficient	T-stat	Coefficient	T-stat
	Impact on Real GDP			
$\Delta$ government expenditure	<b>0.25</b>	<b>2.75</b>	<b>0.37</b>	<b>3.94</b>
$\Delta$ government expenditure – $\Delta$ real potential GDP	0.05	1.01	<b>0.296</b>	<b>2.45</b>
$\Delta$ public revenue	–0.044	–1.032	<b>–0.257</b>	<b>–2.19</b>
	Private Employment			
$\Delta$ unit labor cost	<b>–0.122</b>	<b>–8.38</b>	<b>0.033</b>	<b>4.19</b>
$\Delta$ public investment	<b>–0.028</b>	<b>–3.64</b>	<b>0.016</b>	<b>3.25</b>
	Business Investment			
$\Delta$ corporate taxes	<b>–0.08</b>	<b>–2.21</b>	0.022	0.76
$\Delta$ subsidies	0.048	1.27	<b>–0.17</b>	<b>–3.04</b>
$\Delta$ government spending	<b>–0.394</b>	<b>–2.42</b>	–0.357	–1.16
	Private Consumption			
$\Delta$ income taxes	–0.0068	–0.300	0.044	1.37
$\Delta$ transfers	<b>0.149</b>	<b>2.32</b>	<b>0.142</b>	<b>1.77</b>
$\Delta$ social security	<b>–0.113</b>	<b>–1.92</b>	–0.02	–0.40

Note: The data in bold figure out the effects that are significant.

increasing a Government room for manoeuvre, which will stimulate the economy in escaping from a recession. Extrapolating these results, it seems that the increase in public spending corresponding to a large part of the stimulus plans in 2009 (during a recession period) was likely to give way to a rise in GDP growth. On the contrary, the use of the tax cuts would not have produced significant results on GDP growth.

Beyond the crisis, sustainability concerns will be essential for the French government. This could be achieved as follows. The French government could increase the scope for automatic stabilizers and therefore make the discretionary spending measures reversible. Regarding our results, such a strategy could allow to reduce deficits without negative effects on the economy since in times of non-crisis, the multiplier associated with changes in the differences between changes in government spending and the growth rate of potential output is not statistically significant.

Considerations could also be given to higher taxes since they do not seem to be a threat for a decrease in the real GDP in the short term (we found no significant effects associated with government revenues in non-crisis time). But, the government would need to target the tax increases. This consideration is important given the ongoing debate on the “fiscal shield”. On the one hand, higher direct taxes on firms could force them to cut investment and employment, as reflected by the negative coefficients associated with corporate taxes and the unit labor costs in the non-crisis regime. On the other hand considering increase in direct taxes on consumers would probably not shift their spending.

## 6 Conclusion

It should be reminded that the only empirical models likely to give directly policy implications are structural, such as macro-econometric models or simulation models like DSGE type (but they are accused of ideas based on *a priori*). The models based on reduced forms (which include all VAR models) are simply intended to give a certain number of facts on which we can base the formulation of economic policy. From this point of view, our study based on TVPMS models allows to highlight several interesting points. The analysis of the role of fiscal variables on some major macroeconomic variables through a TVPMS model clearly shows asymmetry in the effects of fiscal variables depending upon whether one is in periods of crisis or good times. These nonlinearities are both frequent (as they exist on all behaviors analyzed: GDP, private consumption, business investment and private employment) and significant.

In particular, if one considers the aggregate GDP, public expenditure has a stronger impact during crisis and the expenditure multiplier is greater than the tax multiplier. The consequence is that, during a crisis, a stimulus plan expenditure-oriented might be more efficient than a recovery plan based on measures of tax relief. The effect of tax-oriented measures is significant when the endogenous variables are private investment and employment.

When households are sensitive to the unemployment situation, tax cuts do not affect increase consumption spending, while transfers are playing a significant role. In terms of economic policy, assuming for example that the government’s exit strategy consists in stimulating private consumption, it has to choose between two instruments: on the one hand, an increase in transfer expenditure financed by borrowing and, on the other hand lower taxes paid by households.

On the firms side, our results show that direct taxes changes induce a (stimulus) effect in the investment rate only during non-crisis periods. A rise in subsidies has a negative influence during crises, as firms reduce their production capacity.

Increased public spending appears to have a strong multiplier effect at the aggregate level, but with crowding-out effects observed on private investment in non-crisis times. Finally, the estimates suggest that employment policies should be asymmetric: fiscal measures aiming at reducing unit labor costs could be efficient in good times, while an increase in public employment is preferable during crisis.



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## FISCAL ACTIVISM IN BOOMS, BUSTS AND BEYOND

Ludger Schuknecht\*

*This paper discusses activist fiscal policies during good times, the crisis period and for the post-crisis period. The study argues, first, that fiscal policies were overly imprudent during the boom phase preceding the crisis. This was due to excessive expenditure growth and problems with measuring the output gap and fiscal stance. Second, during the crisis, too much emphasis was placed on the need for (activist) fiscal demand support despite demand excesses in the boom years in several countries. Fiscal activism focussed less (and less strongly than needed) on the balance sheet nature of the crisis and the significant misallocation of resources. Third, and given strong increases in public expenditure ratios in the crisis, timely fiscal exit strategies need to bring these down to sustainable levels so as to regain fiscal sustainability and to create an environment conducive to consolidation and growth.*

*“Even the most practical man of affairs is usually in the thrall of the ideas of some long-dead economist”. J.M. Keynes*

*“Today, the long-dead economist is Keynes” [...] “The policy mistake has already been made – to adopt the fiscal policy of a world war”. N. Fergusson, Financial Times, 30/31 May 2009*

### 1 Introduction

The financial crisis has changed both the intellectual environment and the outlook for fiscal policies strongly. Before the financial crisis, the consensus appeared to be that discretionary fiscal policies were normally not desirable for demand management (ECB, 2002). Automatic stabilisers in Europe were seen to be large and better targeted and timely for this purpose. Discretionary policy changes would be applied to attain consolidation objectives – which were to be in line with the SGP and structural changes which aimed to boost growth.

With the intensification of the financial crisis in autumn 2008, a renaissance of Keynesian thinking gripped not only much of the economic profession but also many policy makers of all colours. The crisis was declared a demand shock which was argued to require a demand stimulating response (Freedman *et al.*, 2009). While the duration of the renaissance in Keynesian thinking is unclear the much-deteriorated outlook for fiscal sustainability associated with it is certainly a huge challenge for many years to come.

The quick succession of concerns about the economic meltdown followed by concerns about too early or too late fiscal consolidation drowned out a number of very important questions for the handling of this crisis and beyond: what role have fiscal policies played in the boom period and what can be learned? Have fiscal responses in the crisis been adequate and really addressed the key issues? And, on this basis, what should fiscal exit strategies take into account? These are the questions that this study focuses on. Activism, first, refers to active fiscal policy interventions (as opposed to automatic stabilization) that change the fiscal stance with the objective of fiscal

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expansion and consolidation.<sup>1</sup> Second, I will also call activism those fiscal policies that aim to preserve fiscal sustainability given uncertainty about the economic situation and outlook in real time. The study focuses mainly on euro area countries but occasionally also makes reference to and comparisons with other advanced economies.

While the study aims to provide positive analysis, the objective is distinctly normative. Moreover, technical sophistication and depth is sacrificed to allow a broad coverage of the subject within the scope of one paper. The study argues, first, that fiscal policies were overly imprudent in the boom-phase, partly due to real time measurement problems. Second, in the bust phase, analysis into the roots of the crisis should have been deeper and too much emphasis was placed on the need for (activist) fiscal demand support. Although the balance sheet nature of the crisis was little acknowledged, significant fiscal measures to support balance sheets were introduced. Little attention has so far been paid to the fiscal dimension of restructuring of sectors and downscaling of demand that had reached unsustainable dimensions in the boom. Third, fiscal exit strategies are being prepared and implemented in light of unsustainable fiscal balances. However, attention is only slowly focussing on the underlying strategy and this study argues the case for expenditure reform.

The study draws three lessons for activist fiscal policies: first, apply prudent expenditure policies during boom years and improve the measurement of the fiscal stance. Second, target fiscal policies to the true causes of a crisis: support demand via fiscal stimulus only during the deep crisis phase and only to the extent that it does not reflect a correction of excess demand in the boom; help balance sheet repair; and allow the adjustment of unsustainable boom structures. Third, do not procrastinate in correcting fiscal imbalances and focus on reverting unsustainable expenditure ratios. This would contribute to a virtuous cycle of more economic dynamism facilitating fiscal adjustment and balance sheet repair.

## 2 Fiscal activism in the boom period

The experience of the past economic boom suggests that the main challenge for fiscal policies in good times lies in preventing an imprudent expansionary fiscal stance. This is, first, because the measurement of the cyclically-adjusted balance and its change tend to suggest an overly favourable underlying position and an adjustment mirage. Second, this and the strong growth during the boom which can persist much longer than during normal business cycle upturns, tempts policy makers to decide on an expenditure path that looks broadly reasonable *ex ante* but proves unsustainably expansionary *ex post*.

### 2.1 Measurement problems in the boom

In order to decide on the appropriate degree of fiscal activism or automatism, the economic and fiscal position in the business cycle and the impact of the cycle on the fiscal balance need to be known. This, however, is a major challenge (Cimadomo, 2008). First, especially the end of a boom period tends to be characterised by significant downward revisions in the output gap as subsequent busts/downturns are never anticipated. This is illustrated in Table 1 which reports estimates of output gaps for 2007, the final boom year. In real time (Autumn 2007), the output gap was seen as broadly closed in the euro area. Several countries, such as Spain, Ireland or the UK, were seen as having a slightly negative gap even after a decade of boom. The experience of the financial crisis

<sup>1</sup> Recall that automatic stabilizers lead to changes in the deficit mainly as a result of “automatic” changes in revenue over the cycle rather than active or discretionary policy decisions. They leave the underlying balance unchanged.

Table 1

## Output Gap and Cyclically-adjusted Balance for Different Vintages

Country	a) Output Gap		b) Cyclically-adjusted Balance	
	Autumn 2007	Autumn 2009	Autumn 2007	Autumn 2009
Belgium	-0.2	2.4	-0.2	-1.5
Spain	-0.5	1.5	2.0	1.2
Germany	0.3	2.7	-0.1	-1.2
Italy	-0.8	2.8	-1.9	-2.9
France	-0.3	1.9	-2.4	-3.6
Portugal	-1.7	0.6	-2.2	-2.8
Netherlands	-0.4	2.8	-0.2	-1.3
Austria	0.4	2.5	-1.0	-1.7
Ireland	-0.7	4.9	1.2	-1.7
Finland	0.4	4.6	4.4	2.9
Luxembourg	0	5.3	1.2	1.0
Greece	1.3	3.4	-3.4	-5.1
Slovenia	0.9	5.5	-1.1	-2.6
Cyprus	-1.1	1.9	-0.6	2.6
Malta	-0.6	1.3	-1.6	-2.6
Slovakia	1	7.5	-3.0	-4.0
<b>Euro Area</b>	<b>-0.2</b>	<b>2.5</b>	<b>-0.7</b>	<b>-1.8</b>
United Kingdom	-0.1	2.6	-2.7	-3.8
EU27	-0.1	2.7	-1.0	-2.1

Source: European Commission, *Autumn 2007 and Autumn 2009 Forecasts*.

changed this picture dramatically and the euro area was seen to have had a positive output gap of 2.5 per cent in 2007 from the perspective of the autumn 2009 forecast. Revisions for Ireland exceeded 5 percentage points and for some others 3 percentage points of GDP. This is the result of an overestimation of trend growth during the boom years.

The revision of output gaps coincided with a revision in cyclically adjusted balances. While the euro area was seen only in slight deficit (-0.7 per cent) in 2007 for 2007, the underlying balance was seen at -1.8 per cent two years later. The change is around 1 percent for most countries and almost 3 percentage points for Ireland. If this mis-measurement had not occurred, the riskiness of the pre-crisis fiscal position would have been apparent and would have suggested action much earlier.<sup>2</sup>

<sup>2</sup> A first glance at Commission data and a simple OLS regression for EU countries suggests a correlation between output gap revisions and macroeconomic imbalances (as reflected by the current account or the size of the construction sector). Dependent variable: output gap revisions between autumn Commission vintages for 2007 and 2009. Independent variables: a 1 percentage point higher (share in construction/percent of GDP; current account deficit) in 2007 suggests an output gap revision of (1/3 percentage points, 0.2 percentage points).

The measurement problem of the output gap has been made worse by another, by now well-known, problem that concerns the measurement of the elasticity of the cyclically sensitive revenue and expenditure items. As early as 2002, Eschenbach and Schuknecht argued that in boom periods the elasticity of revenues can be much higher than expected if stock market or real estate price gains result in extra revenue from wealth effects on consumption, valuation gains notably in corporate balance sheets or higher asset market turnover. Jaeger and Schuknecht (2004/2007) found that the budgetary elasticity to GDP changes during asset price boom and bust periods is on average twice as high as during more normal times. In the meantime, many further studies on this matter have emerged and broadly confirmed that the related revenue windfalls in booms can result in a consolidation mirage (e.g., Girouard and Price, 2004; Kremer *et al.*, 2006; Morris and Schuknecht, 2007; Martínez Mongay *et al.*, 2007; European Commission, 2009; Tagkalakis, 2009). By the same token, in a bust “unexpected” revenue shortfalls can make the deficit deteriorate much faster and the cyclically adjusted balance worsen much more than discretionary measures would have suggested.

This assessment is broadly confirmed by econometric estimates of asset price related revenue elasticities for the euro area and a number of its member countries as reported in Table 2, by Morris and Schuknecht (2007). In 2002, for example, conventional calculations of the change in the cyclically adjusted balance would have suggested a loosening while an asset price adjusted calculation suggests a tightening in several countries and for the euro area as a whole.

## 2.2 Expenditure trends in the boom

If trend GDP growth, the underlying fiscal balance and adjustment efforts tend to be overestimated in booms it is no surprise that governments get tempted into expenditure trends that are seen as “reasonable” and in line with “automatic stabilisation” *ex ante* while proving destabilizing *ex post*. A simple simulation can illustrate this point. Assume a “light” business cycle as in scenario 1 of Table 3 (average growth of 2 per cent with 3 per cent during the upswing and 1 per cent in the downturn). Revenue is assumed to grow in line with GDP. If automatic stabilizers are allowed to operate and, as assumed here, expenditure growth simply follows trend growth, the expenditure and balance ratio would rise and fall symmetrically over the cycle. However, if as in scenario 2, the economic upswing leads to stronger revenue growth and governments believe that revenue and trend GDP growth have increased permanently they would also argue that a higher spending growth rate can be maintained. If this assumption on growth and revenue turns out to be an error, two things happen: the expenditure ratio at the end of the upswing remains higher than warranted, revenue windfalls would reverse more strongly than anticipated during the downturn. This, in turn, would result in a worse fiscal balance and higher expenditure ratio at the end of a full cycle as reflected in the second scenario. With such a policy error in the boom, a return to the starting fiscal position at the end of the full cycle would then require pro-cyclical tightening in the downward phase.

The second simulation scenario illustrates the experience of several euro area countries over the pre-crisis boom period rather well. Real expenditure growth for the average of the area and several countries was well above trend growth for the 2000-07 period (Table 4). Just to illustrate, a 1 percent higher annual expenditure growth for an expenditure ratio around 45 per cent of GDP for a period of seven years makes a difference of about 3 per cent of GDP in the expenditure ratio at the end of this period. For the euro area average, the excess expenditure growth was perhaps half that figure.

The relatively strong expenditure growth in the boom years reflects underlying policy decisions. Public wages, for example, grew very strongly in a number of countries in the boom and notably in Ireland and Greece but also in Spain, Luxembourg and Portugal. These growth rates were much above the euro area average and above private wage growth in these countries

Table 2

**Impact of Asset Prices on Structural Budget Balances**  
(percent of GDP)

**a) Change in Cyclically-adjusted Balance**

Year	Belgium	Germany	Spain	France	Ireland	Italy	Neth'nds	Finland	Euro Area
1999	-0.38	0.54	1.18	0.36	-0.79	0.83	0.47	0.05	0.51
2000	-0.19	-0.54	-0.29	-0.50	1.17	-1.27	0.46	4.74	-0.42
2001	0.98	-1.58	0.46	0.07	-3.12	-1.23	-1.00	-1.28	-0.70
2002	-0.08	-0.24	0.68	-1.06	-1.06	0.71	-0.49	0.01	-0.12
2003	0.55	0.28	0.62	-0.50	1.60	-0.08	-0.21	-0.83	0.03
2004	-0.52	0.13	0.14	0.45	1.75	0.15	1.24	-0.32	0.23
2005	-1.70	0.65	1.47	1.16	-0.15	-0.04	1.72	0.45	0.67

**b) Change in Cyclically-adjusted Balance Net of Asset Price Effects**

Year	Belgium	Germany	Spain	France	Ireland	Italy	Neth'nds	Finland	Euro Area	
									(1)	(2)
1999	-0.25	0.20	0.88	-0.09	-1.28	0.68	-0.33	-0.38	0.18	0.20
2000	-0.05	-0.70	0.00	-0.64	1.11	-1.56	-0.04	2.41	-0.62	-0.61
2001	1.69	-0.92	1.19	0.59	-2.23	-1.00	-0.25	-2.40	-0.17	-0.27
2002	0.43	0.26	1.12	-0.66	-0.65	0.71	0.19	2.25	0.21	0.26
2003	0.35	0.14	0.03	-0.73	1.29	-0.31	-0.08	-0.08	-0.12	-0.15
2004	-1.27	0.11	-0.53	0.23	1.50	-0.05	1.38	-0.30	0.07	0.08
2005	-1.91	0.40	0.70	0.98	-0.31	0.05	1.45	0.38	0.44	0.47

Sources: Morris and Schuknecht (2007).

<sup>(1)</sup> Estimated.

<sup>(2)</sup> Weighted average of country estimations.

(Table 5). Public employment was also imprudently buoyant in the boom years, notably in Spain, the Netherlands and Ireland (Table 6).

As a result of these trends, public expenditure ratios in the later boom years changed very little in the euro area, except for Germany (Table 7). A number of countries even saw their expenditure to GDP ratio rise, notably Ireland. But many countries did not experience a decline in

Table 3

**Simulation of Revenue, Expenditure and Fiscal Balance Ratios to GDP****Scenario 1: Normal Cycle**

<b>Time</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Growth Y		2%	3%	3%	3%	2%	1%	1%	1%	2%
Growth T		2%	3%	3%	3%	2%	1%	1%	1%	2%
Growth G		2%	2%	2%	2%	2%	2%	2%	2%	2%
Rev. ratio	45	45	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Exp. ratio	45	45	44.6	44.1	43.7	43.7	44.1	44.6	45.0	45.0
Def. ratio	0	0	0.4	0.9	1.3	1.3	0.9	0.4	0.0	0.0

**Scenario 2: Revenue Cycle cum Expenditure Acceleration**

<b>Time</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Growth Y		2%	3%	3%	3%	2%	1%	1%	1%	2%
Growth T		2%	4%	4%	4%	2%	0%	0%	0%	2%
Growth G		2%	2%	3%	3%	3%	3%	3%	3%	3%
Rev. ratio	45	45	45.4	45.9	46.3	46.3	45.9	45.4	45.0	45.0
Exp. ratio	45	45	44.6	44.6	44.6	45.0	45.9	46.8	47.7	48.2
Def. ratio	0	0	0.9	1.3	1.8	1.3	0.0	-1.4	-2.8	-3.2

Table 4

**Real Expenditure Versus Trend GDP Growth**

<b>Country</b>	<b>2000-05</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2000-05</b>	<b>2006</b>	<b>2007</b>
	<b>Real Expenditure Growth</b>				<b>Trend GDP Growth</b>		
Spain	4.1	4.1	3.3	2.5	3.2	2.2	1.8
Germany	0.8	0.5	1.9	1.5	1.2	0.9	0.9
Italy	2.7	1.8	2.4	2.8	1.1	0.5	0.3
France	1.9	2.4	2.5	2.5	1.9	1.5	1.3
Netherlands	3.1	1.8	1.6	2.7	2.2	1.7	1.7
Austria	1.6	1.6	2.1	2.0	2.1	1.8	1.6
Ireland	3.9	3.5	1.3	-1.2	5.9	3.0	2.1
Greece	3.3	3.1	3.0	3.5	3.7	3.0	2.6
<b>Euro Area 12</b>	<b>2.1</b>	<b>1.9</b>	<b>2.3</b>	<b>2.2</b>	<b>1.8</b>	<b>1.3</b>	<b>1.1</b>

Source: Ameco, Autumn 2009.



the expenditure ratio commensurate with the economic environment and the operation of automatic stabilisers.

An important reason for imprudent expenditure trends in the euro area were not *ex ante* plans but slippages in the budget execution. On average, public expenditure in the euro area increased by more than 0.5 per cent faster than planned between 1999 and 2007 for the average of the euro area (Figure 1). This may reflect two important factors: first, plans may not have been consistent with commitments arising from policy choice. Second, slippages may also reflect poor budget execution due to weak expenditure rules.

All in all, measurement problems and expenditure developments are the main reason for a relatively weak starting position of public finances in the euro area before the crisis struck. The average euro area deficit ratio still posted a deficit in 2007 and the public debt ratio in the euro area only improved by 8 percentage points since the mid-1990s peak of 74 per cent of GDP and by 3 percentage points between 2003 until 2007 when it stood at 66.4 per cent of GDP. In fact, public debt has been rising much more

Table 5

**Compensation per Public and Private Employees, 1999-2008**  
(accumulated percent growth in nominal terms)

Country	Compensation per Government Employee	Compensation per Private Employee	Compensation per Employee, Total Economy
<b>Euro Area 12</b>	<b>35.3</b>	<b>23.7</b>	<b>25.3</b>
Belgium	38.2	31.5	33.0
Germany	16.6	12.2	12.4
Ireland	99.4	70.5	76.6
Greece	107.3	74.1	79.5
Spain	51.9	27.7	36.5
France	32.0	32.7	32.4
Italy	41.8	24.9	27.9
Luxembourg	53.7	37.7	38.7
Netherlands	33.2	40.8	39.5
Austria	28.4	25.7	25.0
Portugal	52.2	38.4	40.1
Finland	41.6	39.3	40.0

Source: OECD (2009), *Economic Outlook Database*, November.  
Missing government employment data for Germany, Greece and Austria have been taken from the Spring 2006 (1998, 1999) and Spring 2007 (2000-06) issues.

Table 6

**Public Employment in Selected OECD Countries**  
**Public Employment Growth**  
(percent)

Country	1991-1999	1999-2007
Spain	16.5	36.8
Germany	-12.7	-5.4
Italy	-3.2	2.3
France	5.6	7.0
Netherlands	-0.6	13.1
Austria	-3.0	-5.9
Ireland	8.9	46.5
<b>Euro Area 12</b>	<b>-0.1</b>	<b>7.3</b>
United Kingdom	-10.2	14.1
United States	9.5	9.4
Japan	5.0	-1.3

Source: OECD (2009), *Economic Outlook Database*, November.

**Table 7**  
**Public Expenditure Developments in Selected Countries, 2004-07**  
*(percent of GDP)*

Country	2004	2007
Belgium	49.3	48.4
Germany	47.1	43.7
Ireland	33.5	38.4
Greece	45.5	44.1
Spain	38.9	39.2
France	53.2	52.3
Italy	47.7	47.9
Netherlands	46.1	45.5
Portugal	46.5	45.7
Finland	49.9	47.3
<b>Euro Area 12</b>	<b>47.6</b>	<b>46.1</b>
Sweden	55.3	52.5
United Kingdom	42.9	44.0
Japan	37.0	36.0
United States	36.0	36.7

Source: European Commission, Autumn 2009.

strongly in downturns than it has been falling in upswings for the past three decades (Figure 2).

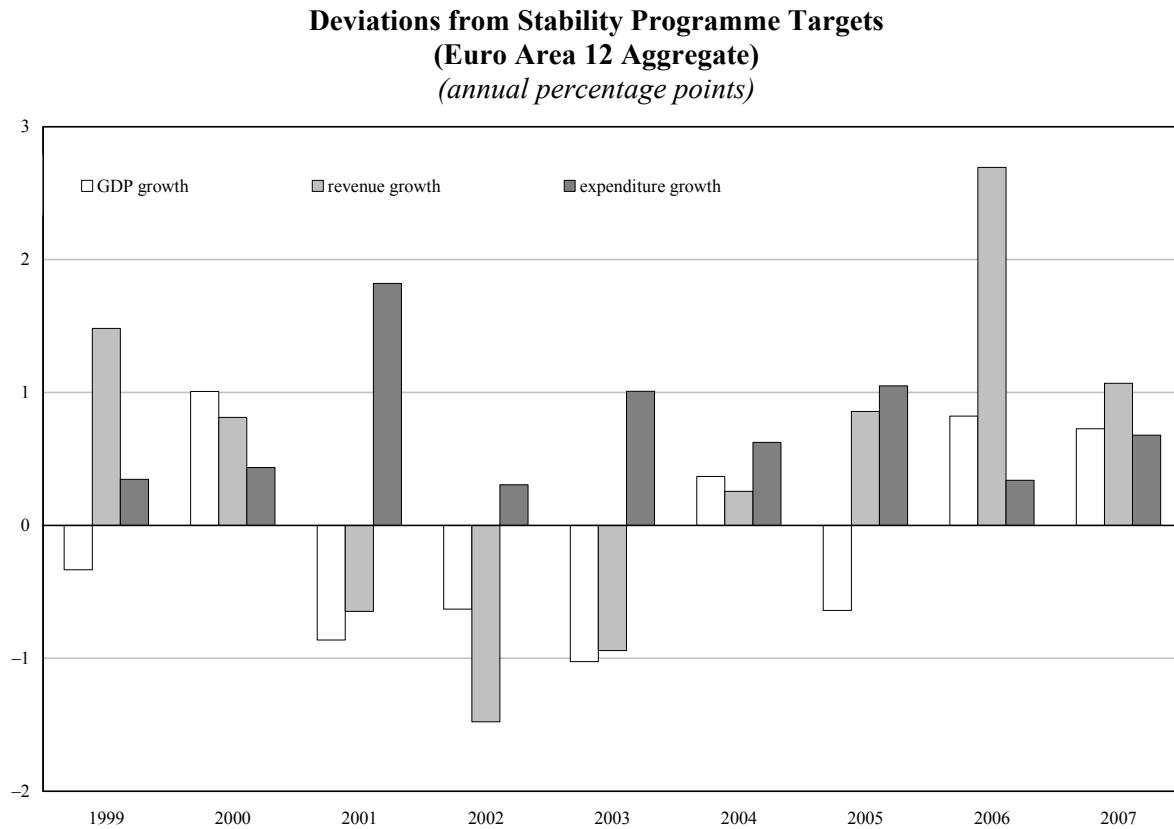
The lesson of this experience is twofold. First, the measurement of the underlying fiscal balance and stance needs to improve. Additional indicators to check the robustness of output gap estimates such as current account imbalances, capacity utilization or real estate prices and the inclusion of further variables such as asset prices in the stance measurement may be considered. Several of the quoted studies have pointed to ways to improve the measurement of the fiscal stance.

Second, and given that measurement problems can probably not be excluded in the future, it is advisable to follow what I would call “activist prudence” in good times. This should ensure that expenditure dynamics remain sustainable which, in turn, helps mitigate the risk of unsafe positions at the end of a boom. Three elements are important to consider: i) trend growth assumptions need to be prudent and the baseline expenditure scenario should be built on this (any expenditure consolidation needs should then be deducted from this scenario); ii) expenditure commitments need to be consistent with the desired expenditure growth path and policy changes should be implemented where needed (Tanzi and Schuknecht, 2000); and iii) expenditure rules may need to be improved if slippages are the result of undue leeway in budget execution (European Commission, 2007). Automatic stabilizers may then normally operate more “safely” around the resulting spending and deficit path.

### 3 Fiscal activism in the crisis

The experience of the financial crisis suggests two main questions which could have been examined with more care from the outset: i) what is the underlying problem of the steep decline in demand in late 2008 and how much of that should be addressed by what type of fiscal policy? And ii), how much deterioration of the fiscal balance can and should we afford from a short and long term perspective. This study will only deal with the first issue in detail. I will argue that indeed there appears to have been a Keynesian-type demand shock after the Lehmann default. However, too much attention has been focussed inappropriately on the demand-stimulating role of fiscal activism. The crisis was and is mainly a balance sheet crisis where excessive private debt accumulation (to finance excess private demand in the boom) had to be followed at some point by a phase of more subdued demand so as to allow balance sheet repair. Moreover, the boom period

Figure 1

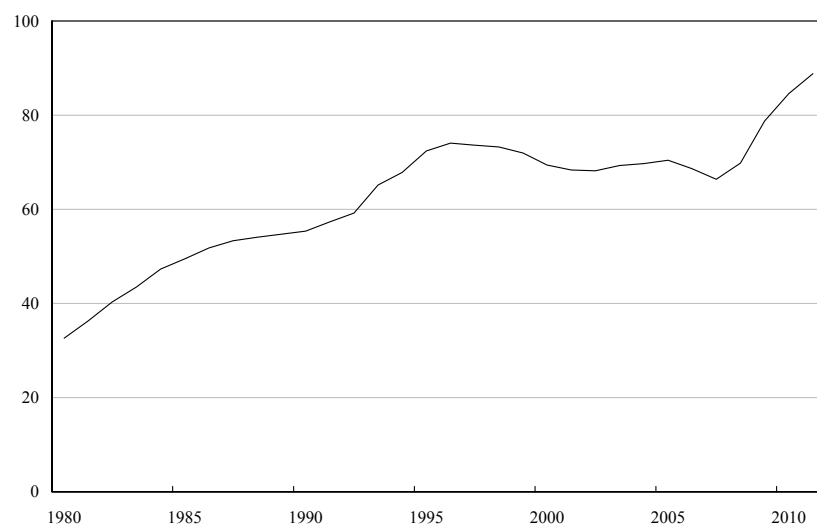


Sources: AMECO, Stability programmes and ECB calculations.

with excess demand “naturally” resulted in excess supply in the “profiting” sectors, in particular construction/real estate and finance. On this basis one could have argued for fiscal activism to support balance sheet repair and the structural rebalancing of economies. But on the demand side, the issue is complex and the Keynesian argument for more stimulus is countervailed by the structural argument of lower equilibrium output and demand.

Figure 2

**Public Debt Developments in the Euro Area, 1980-2011  
(percent of GDP)**



Source: AMECO (based on the European Commission 2009 Autumn forecast).

Table 8

**Fiscal Deficit Changes in the Financial Crisis in the EU and Euro Area**

Aggregate	Total Change in the Deficit with Respect to Previous Year	of which:			
		Cyclical Effect	Budgetary Impact Discretionary Measures	Residual Change in the Primary Cyclically-adjusted Balance	Budgetary Impact Change in the Interest Expenditure
2009					
EA-16	-4.4	-2.4	-1.1	-0.9	0
EU-27	-4.6	-2.4	-1.3	-1.0	0
2010					
EA-16	-0.5	0.0	0.1	-0.3	-0.2
EU-27	-0.6	0.0	0.2	-0.4	-0.2
2011					
EA-16	0.4	0.2	0.4	0.0	-0.2
EU-27	0.6	0.2	0.4	0.2	-0.2

Source: European Commission, Autumn 2009 Forecast.

**3.1 The Keynesian crisis (phase)**

In the autumn of 2008, after the collapse of Lehman, calls for activist fiscal policies emerged very quickly. In retrospect, the concerns about the demand outlook underlying these calls appear at least partly justified. Euro area GDP fell by almost 2 per cent in the fourth quarter of 2008 and by another 2.5 per cent in the first quarter of 2009. The European Commission called for activist measures to be targeted, temporary and timely (TTT) so as to minimise the risk of repeating the mistakes of the seventies and early 1980s when fiscal activism was often late (and hence procyclical), poorly targeted and non-reversible, thus leading to a permanent worsening of fiscal balances and structures. Moreover, it was pointed out that large automatic stabilisers in Europe were already contributing significant support to demand.

Table 8 shows that of the likely worsening of the fiscal balance in 2009 by about 4.5 per cent of GDP more than half came from automatic stabilizers (cyclical effect) and another quarter from the reversal of revenue windfalls discussed in the previous section (part of “residual change”). Only one quarter was due to discretionary fiscal loosening. However, this assessment hinges on the fact that there will be no major further *ex post* downward revisions of the output gap and trend growth during the crisis which would drive up the discretionary component of the budget deterioration.

With this caveat in mind and while it is too early to come to an overall judgement, the strong role of automatic stabilizers for boosting demand appears appropriate from this perspective. One could probably also argue for a discretionary fiscal demand boost during the immediate deep crisis phase from a demand management perspective.

But there are several reasons to be sceptical about the overall fiscal strategy pursued. The deep crisis phase when arguably a demand and confidence boost was warranted only lasted a short period. Already in the second quarter of 2009, survey indicators pointed to much less negative growth in real time and positive growth (as later confirmed) resumed in the third quarter in the euro area (Figure 3). Further arguments relate to political economy factors as experienced in the 1970s. First, little analysis was undertaken as to where and how much demand shortfall was emerging. Consequently, targeting was partly poor. In Germany, for example, a demand shock in the export sector was met with an investment programme directed at a

construction sector that was fully employed. Stimuli were also captured by special interests that would not have stood a chance in normal times. VAT reduction for German hoteliers may be an example. Second, in many instances, timing was poor and much of the stimulus took time to take effect. In fact, in countries such as the Netherlands, Germany or Austria, the fiscal stimulus continued well into 2010 when activity has already been recovering for quite some time. Third, a number of countries also introduced measures that are hard to reverse such as public wage or benefit increases. Immediate tax rebates, VAT cuts and to a certain extent also car wrecking premia may have been the best measures from a TTT perspective.<sup>3</sup>

Moreover, it may turn out that part if not much of the demand fall in the crisis was not a negative demand shock but the reversal of excess demand during the boom linked to unsustainable wealth effects in many countries cum a supply shock due to mis-allocated resources. Then perhaps activist demand stimulation or even the full operation of automatic stabilisers would not have been justified and certainly not for the time after the deep crisis phase. This issue will be discussed in more detail in Section 3.3.

Figure 3

**Purchasing Managers' Indices (PMIs) for the Euro Area**  
(monthly data, seasonally adjusted)



Source: Markit.

<sup>3</sup> There are also substantial knowledge gaps as regards size and functioning of fiscal multipliers. This makes it very difficult to deliver well-targeted fiscal stimulus measures (Bouthevillain *et al.*, 2009).

### 3.2 *The balance sheet crisis*

A main cause of the financial crisis was growing leverage in the private sector in the boom years. Rising asset prices and wealth allowed rapid consumption and debt growth. Figure 4 on household and corporate debt developments in a selection of industrialized countries illustrates the growing indebtedness, except in Japan and Germany. Ultimately, however, asset prices started to reverse on the back of housing over-supply and debt overhangs emerged. Part of the crisis-related slump in consumer, investment and credit demand can in fact be related to the desire by agents to deleverage and reduce their own default risk after they recognised that real estate prices were not sustainable and, thus, debt too high. However, notably after the Lehman default this risked to become a disorderly process with a financial-economic downward spiral.

Governments responded swiftly to this impending risk of a downward spiral of financial and non-financial bankruptcies and balance sheet repair-induced demand loss. After the insurance of most or all deposits, governments introduced guarantee schemes, injected capital and took a number of other measures to secure the stability of the financial system. The impact of these measures on public debt was important. It averaged 3.5 per cent GDP for the euro area and much more in some countries by mid 2009. In addition, contingent liabilities with a ceiling of about 20 per cent of GDP for the euro area were accumulated (Table 9).<sup>4</sup>

Further ad hoc measures were introduced in many countries to support balance sheets and reduce the risk of disorderly deleveraging in the private non-financial sectors (households and corporations): governments “organised” mortgage loan rescheduling, deferral of payments, lending programmes for the unemployed and guarantee and credit programmes for corporations. These programmes provided balance sheet support to households and corporations and prevented bankruptcies and fire-sales of assets. Tax cuts and rebates probably also reduced household balance sheet problems indirectly (even though they had a more Keynesian motivation).

The magnitude of the debt overhang at the time of writing of this study is not known. However, the huge magnitude of losses that accumulated in the financial sector as the crisis unfolded is an indication (Figure 5). Moreover, significant balance sheet problems remained at the time of writing of this study and significant further financial sector losses were seen to be in the pipeline (Table 10). At the end of 2009, the household debt to disposable income ratio only stabilised at a very high level in the euro area (Figure 6).

Abstracting from any potential “collateral damage” via more moral hazard, less competition and special interest capture of the support, the government role in mitigating balance sheet risks and preventing disorderly balance sheet adjustment can probably be called rather successful. Although no “scientific” assessment is yet available, the speedy and targeted action is likely to have prevented a much deeper financial and economic crisis.

### 3.3 *The “crisis” of economic structures: adjusting excess supply and demand*

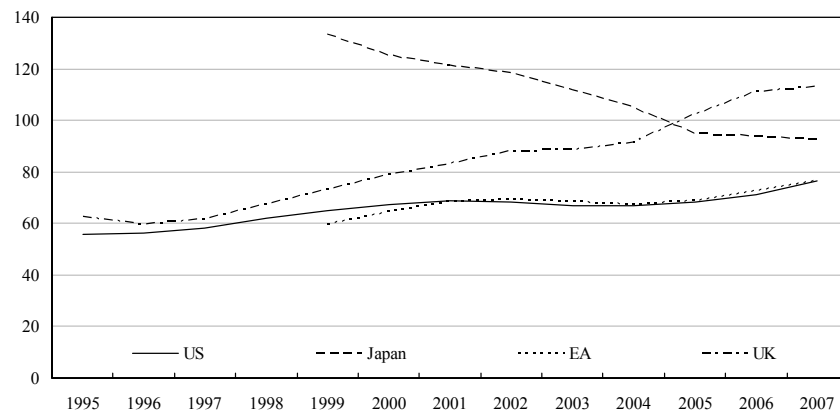
Finally, the importance of excess demand and structural resource mis-allocation in the boom phase is relevant for evaluating the fiscal policy response to the crisis (see also Tanzi, 2009). A number of countries experienced a strong expansion of certain sectors in the boom. If such expansion turns out unsustainable, a significant physical and human capital re-allocation and a downward shift in the level of potential output would be implied. At the same time, demand levels in the boom phase may have been exaggerated and unsustainable. In fact, this is the origin of the

<sup>4</sup> These measures were complemented by liquidity enhancing measures, interest rate cuts and further enhanced credit support measures by the European Central Bank.

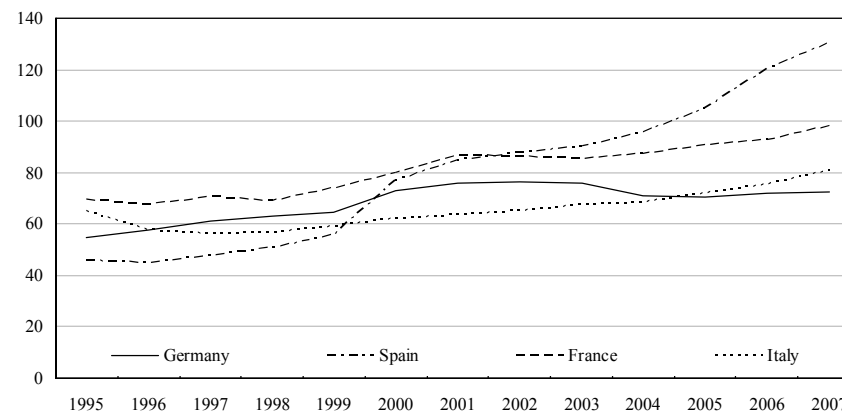
**Figure 4**

### Household and Corporate Debt

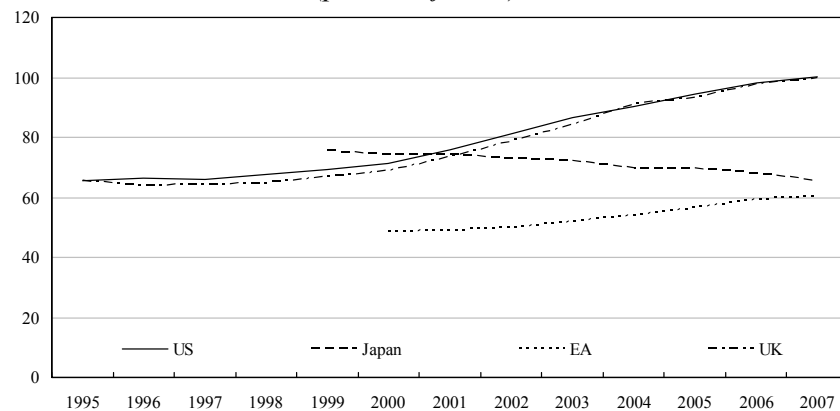
**Debt of Non-financial Corporations**  
(percent of GDP)



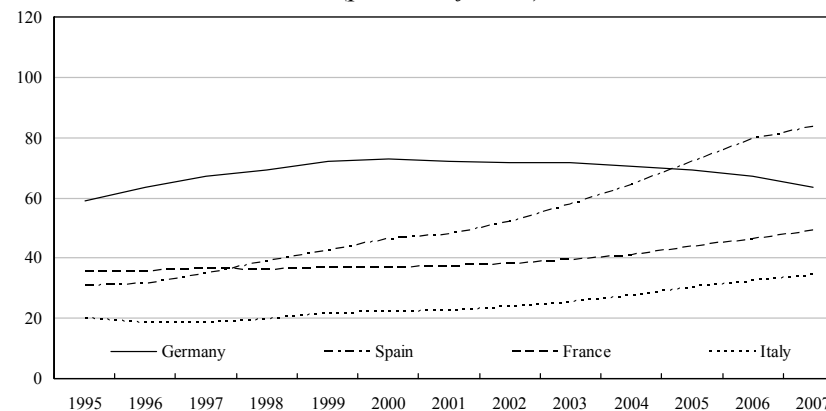
**Debt of Non-financial Corporations**  
(percent of GDP)



**Debt of Households**  
(percent of GDP)



**Debt of Households**  
(percent of GDP)



Source: ECB.

Table 9

**Cumulative Financial Sector Interventions and Fiscal Impact, 2008-09**  
(percent of 2009 GDP)

Country	Type of Intervention							Fiscal Impact		
	Guarantees	Capital Injections		Asset Purchase	Asset Swaps / Asset Lending	Debt Assumptions / Cancellations	Other Measures	Government Debt	Government Contingent Liabilities	
		Acquisition of shares	Loans						Provided	Ceiling
Belgium	21.0	4.0	2.1	0.0	0.0	0.0	0.0	7.4	21.0	34.6
Germany	6.3	1.3	0.0	1.7	0.0	0.0	0.0	2.9	6.3	18.7
Ireland	214.8	4.2	0.0	0.0	0.0	0.0	0.0	4.2	214.8	242.0
Greece	0.6	1.6	0.0	0.0	1.8	0.0	0.0	1.6	0.6	6.1
Spain	3.1	0.0	0.0	1.8	0.0	0.0	0.0	1.8	3.1	18.9
France	1.1	0.8	3.2	0.0	0.0	0.0	0.0	4.1	1.1	16.8
Italy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Luxembourg	12.8	8.3	0.0	0.0	0.0	0.0	0.0	8.3	12.8	0.0
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands	5.0	6.5	7.6	3.9	0.0	0.0	0.2	18.2	5.0	35.0
Austria	6.6	1.7	0.0	0.0	0.0	0.0	0.0	1.7	6.6	27.8
Portugal	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	12.4
Slovenia	0.0	0.0	0.0	0.4	0.0	0.0	3.6	4.0	0.0	33.2
Slovakia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finland	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	28.1
Euro area	7.5	1.3	1.2	0.9	0.0	0.0	0.0	3.4	7.5	19.9

Source: ECB Monthly Bulletin, July 2009.

Table 10

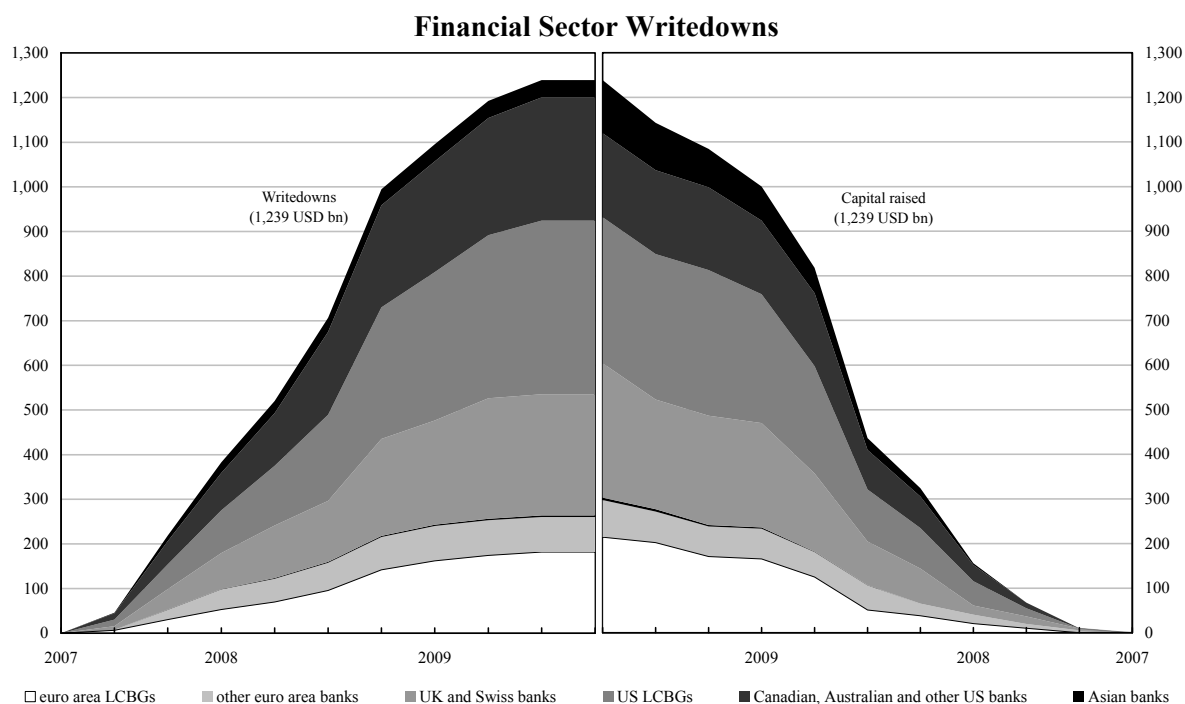
**Expected Financial Sector Losses**

	Estimated Exposure	Implied Write-downs 2009 December FSR	Estimated Loss Rate (percent)
Cash and synthetic structured credit securities	1,122	169	15.1
Other security holdings	1,717	28	1.6
Loans	11,424	355	3.1
<b>Total</b>	<b>14,263</b>	<b>553</b>	<b>3.9</b>

Source: ECB, Financial Stability Report, December 2009.



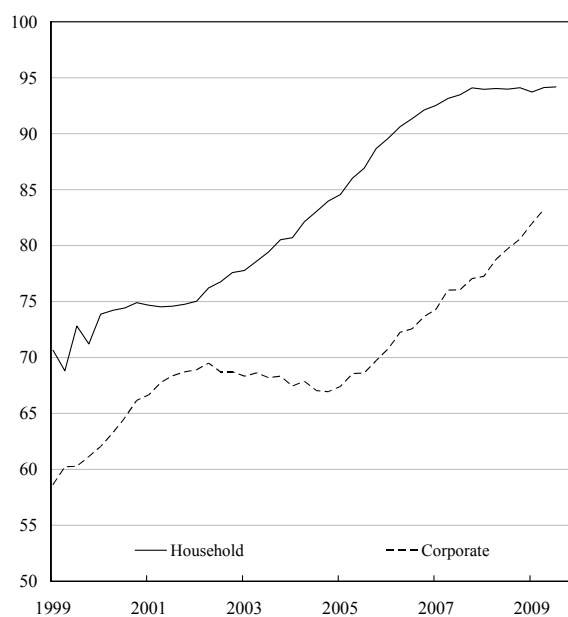
Figure 5



Source: ECB (2009), *Financial Stability Report*, December.

Figure 6

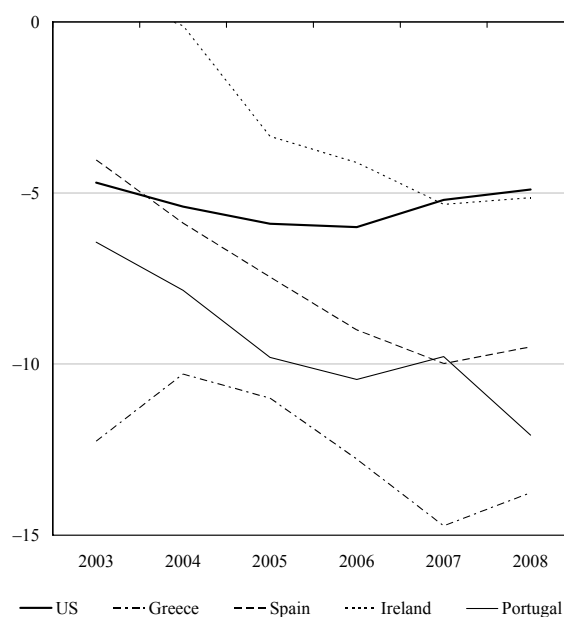
**Household and Corporate Indebtedness**  
(percent of gross disposable income for households, of GDP for corporations)



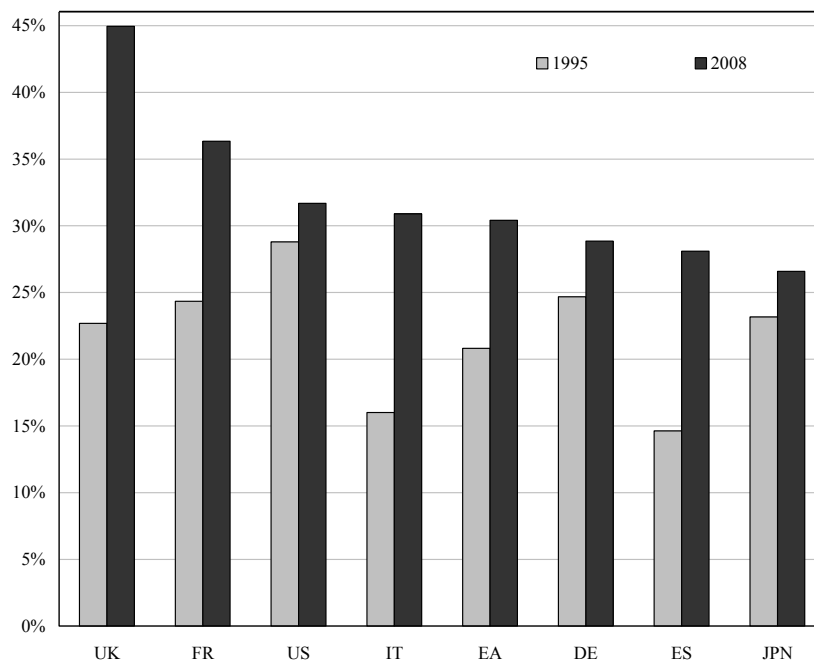
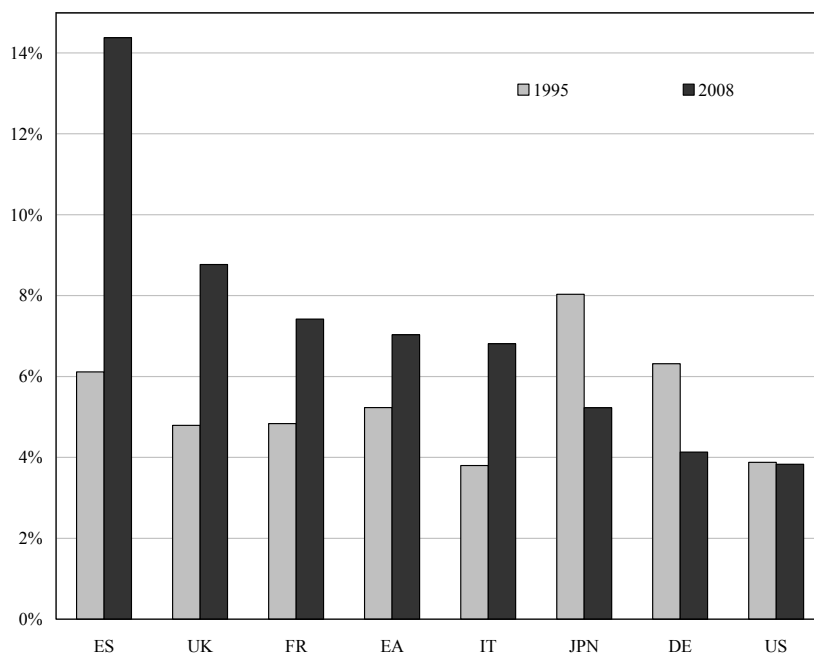
Sources: ECB and Eurostat.

Figure 7

**Current Account Imbalances, Selected Countries**  
(percent of GDP)



Source: European Commission, Ameco, Autumn 2009.

**Figure 8****Contribution of Finance and Construction to GDP***(percent of GDP)***Financial Sector****Construction**

Source: European Commission, Ameco, Autumn 2009.

private sector debt increase mentioned above. It is also reflected in the large and persistent current account deficits in a number of euro area and other advanced economies (Figure 7).

Current account balances had deteriorated significantly in a number of euro area countries plus some other advanced economies during the boom phase, suggesting excess demand in the economy. In Spain, Portugal and Greece, current account deficits were near or above 10 per cent of GDP towards the end of the upswing.

A cursory look at some structural changes over the boom phase is also worthwhile. Figure 8 reports that a number of countries had seen a major shift in the output composition towards finance (in the broadest sense, including financial services, real estate, renting and business activities) and construction. It is not clear what share of output is sustainable. But it is unlikely that a mature economy with relatively limited growth, an excess housing stock and an aging population (like Spain) can sustain a construction sector much above the average for industrialized countries. This seems to be around 5 per cent of GDP rather

than the 14 per cent reported for Spain in 2008. Similarly, there seems to have been a general relative output shift towards finance with an average around 25-30 per cent. It is not clear that the 45 per cent figure for the UK is sustainable even with London continuing to be a major global financial center.

What would be the implications of this? First, if equilibrium output and demand were lower than the actual level at the end of the boom, the crisis phase may have mainly been an (admittedly very abrupt) correction of imbalances and not a Keynesian demand shock. Second, especially wages and benefits in the private and public sector adjusted little (and as mentioned even at times significantly increased). They will need to adjust to the new demand/supply equilibrium as lower profits can most likely not fully and permanently absorb the adjustment. One could then argue that even the operation of automatic stabilizers may have unduly kept demand at an unsustainable level and delayed economic restructuring, thus, undermining also the path of future output and demand growth.<sup>5</sup> For example, if the fiscal response to the crisis implies continued public wage and benefit growth along the pre-crisis output path this would also push up private wage growth and reservation wages more than sustainable and desirable. This would reduce employment and growth. At the same time, one could also argue that some smoothening of demand and adjustment via fiscal stabilisation was warranted until potential output has caught up again. In particular in countries with significant structural resource re-allocation needs, this would cushion the social costs and support the human capital re-allocation via unemployment benefits, education and retraining.

When seeing the crisis from this perspective, these considerations speak against much of a fiscal stimulus. They would possibly even argue against a far-reaching shielding of much of the population against the impact of the crisis via automatic stabilisers. The risk is great that economic dynamism is reduced and demand is stabilised too much above equilibrium. It would then take a very long time for equilibrium output to catch up with a level of government commitments that can be financed. The consequence is high and persistent deficits and rapidly rising debt. This raises the risk of a public balance sheet crisis (which in fact had already gripped and risked to spill over to others at the time of writing of this study).

Second, the need for economic restructuring is too much on the back burner of the crisis debate. On the supply side, few banks and car factories have so far closed shop in Europe (in contrast to the US where this figure is much larger also due to the earlier start of the crisis). On the other hand, construction firms do not seem to be kept alive and significant bank restructuring is taking place, not least due to the European Commission.

All in all, what are the record and lessons for fiscal activism in this crisis? First, analyse the origins of the crisis properly as this points to the desirable remedies. Second, address the right problem with the right measures in a targeted and timely manner. The record of fiscal activism has been mixed: i) there has clearly been too much emphasis on Keynesian-type demand support and perhaps even for automatic stabilisers; Keynesian support should have probably ended in the summer of 2009 at the latest if warranted at all; ii) governments appropriately supported balance sheet repair even though the balance sheet nature of the crisis was not fully appreciated in many quarters; and iii) there has been little focus on facilitating economic restructuring and too little acknowledgement of the need for a downward adjustment of aggregate demand at least in some countries.

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<sup>5</sup> Koopman and Szekely (2009) provide an excellent overview over the factors that could be detrimental to the recovery of the output level and trend growth. These factors include the locking in of resources in unproductive activities, the disincentives and lack of opportunities to find new jobs (and the related destruction of human capital) or the adverse effect of credit constraints on investment.

## 4 Fiscal activism beyond the crisis

### 4.1 Deficit and debt dynamics

In light of the earlier considerations, it is worth taking a closer look at the fiscal fallout of the crisis from two angles: first, what activist policies are needed to return to fiscal sustainability, and second, what should be the underlying strategy, notably as regards expenditure and revenue reform? The first issue can be dealt with very briefly as it has received significant attention elsewhere: it is undoubted that fiscal trends as projected by the European Commission in its autumn forecast would be unsustainable. A deficit ratio between 6.5 and 7 per cent of GDP in 2009-11 on a no-policy-change assumption would bring the average public debt ratio to 90 per cent of GDP in 2011 and on an explosive path. Aging, potential further financial sector bail-out costs due to unrepaired private balance sheets, and lower trend growth would exacerbate this picture. This poses great risks to the long term outlook for fiscal sustainability and would not facilitate the future task of the European Central Bank.<sup>6</sup> Even if debt sustainability concerns can be contained, there is little fiscal leeway for another major crisis if the debt increase of this crisis is not reversed.

It is therefore undoubted that fiscal activism in the coming years means fiscal consolidation: euro area countries need to pursue an ambitious and determined fiscal adjustment strategy. The December 2009 package of Excessive Deficit Procedures under the Stability and Growth Pact for 11 euro area countries required a start of fiscal adjustment in 2010/11 and a correction of excessive deficits in most cases in 2013 (Table 11). On average, annual adjustment efforts would have to be near 1 per cent of GDP. Even if these recommendations were fully implemented, the euro area deficit would fall below 3 per cent only in 2013 and the debt ratio would stabilise near 90 per cent of GDP. A return to pre-crisis debt ratios in the euro area would take until the 2020s. These parameters suggest that the package is ambitious but it is clearly the minimum needed.<sup>7</sup>

Finally, there is the issue of timing. Given fickle markets which can lose confidence very quickly and which have tested a number of governments over the crisis, there is a clear reason to err on the cautious side, notably for large countries. Procrastination would not only result in further debt increases with adverse effects on confidence by the public. A small country can, if needed, be supported by the deep pockets of other governments or the IMF (as in the case of Greece). However, this is most probably not the case for major economies.

### 4.2 Expenditure dynamics and reform

Finally, and in light of the fiscal outlook, which consolidation strategy should be applied and, more specifically, what role should expenditure and revenue adjustment play? There are three arguments why this can only come through an emphasis on reducing unsustainable expenditure dynamics. First, expenditure reform is needed to correct the increase in relative public and private sector wages over the crisis that would otherwise result in less incentives to work (via higher reservation wages), drawing talent away from the private sector (via higher public wages) and reduce investment (via excessive wages/low profits and disincentives to adjust human and physical capital). When looking at the fiscal balance deterioration of roughly six percentage points of GDP in 2007-10, it is noteworthy that three quarters of this reflects an increase in the expenditure ratio (Table 12). Most of this increase is on government consumption (including public wages) and transfers. These two expenditure categories continued to grow broadly in line with pre-crisis trends

<sup>6</sup> High public debt ratios also risk undermining automatic stabilisation as rising deficits and debt would be increasingly countervailed by Ricardian saving (Nickel and Vansteenkiste, 2009).

<sup>7</sup> The 2009/10 update of countries' stability programmes is broadly in line with these parameters which is a first good sign, even though in many instances the underlying strategies and measures have not been carefully designed.

while real output is about 3 per cent lower in 2010 than in 2007. This is important because it confirms the earlier conjecture that governments have fully shielded large parts of the population from the impact of the crisis. A return of spending on public wages and transfers to pre-crisis ratios seems, hence, reasonable from a structural and distributional perspective and it would eliminate most of the deficit problem.

The second argument for expenditure-based consolidation derives from the fact that the optimal size of government is much smaller than the average post-crisis spending ratio of over 50 per cent of GDP. This ratio is now near or above its historical record in many euro area and other advanced economies (Table 13). It is much higher than the pre-crisis ratio of about 45 per cent and way beyond the 30-40 per cent ratio that some literature typically sees as necessary to attain core public sector objectives or that attains an optimal degree of stabilisation (Tanzi and Schuknecht, 2000 and 2005; Buti and Van den Noord (2005).

The third argument is linked to revenue developments over the

Table 11

## Excessive Deficit Procedures in Euro Area Countries

Country	Budget Balance 2010 (percent of GDP)	Consolidation Start	Deadline	Recommended Average Structural Adjustment (percent of GDP, 2010-13)
Belgium	-5.8	2010	2012	3/4
Germany	-5.0	2011	2013	$\geq 0.5$
Ireland	-14.7	2010	2014	2.0
Greece	-12.2	2009	tbd	tbd
Spain	-10.1	2010	2013	1.5
France	-8.2	2010	2013	1.0
Italy	-5.3	2010	2012	$\geq 0.5$
Malta	-3.0	2009	2010	-
Netherlands	-6.1	2011	2013	3/4
Austria	-5.5	2011	2013	3/4
Portugal	-8.0	2010	2013	1 1/4
Slovakia	-6.0	2010	2013	1.0
Slovenia	-7.0	2010	2013	3/4
<b>Euro area</b>	<b>-6.9</b>			

Table 12

## Public Spending in the Euro Area, 2007-10

Euro Area 12	2007	2010	2007-2010
Total expenditure ratio	46.1	50.6	4.5
Transfers	15.9	17.8	2.0
Government consumption	20.1	22.0	1.9
<i>Ad memoriam: fiscal balance</i>	-0.6	-6.9	-6.3

Source: European Commission, Ameco.

**Table 13**

**Public Expenditure in the Euro Area in Historical Perspective**  
(percent of GDP)

Country	Historical peak	Year	2007	2010
Belgium	63.8	1983	48.4	53.8
Germany	50.2	1996	43.7	48.3
Ireland	56.2	1982	38.4	49.1
Greece	46.6	2000	44.1	49.4
Spain	47.6	1993	39.2	45.6
France	55.4	1996	52.3	55.1
Italy	57.7	1993	47.9	50.8
Netherlands	58.3	1983	45.5	50.9
Portugal	47.7	2005	45.7	51.5
Finland	55.4	1996	47.3	55.0
<b>Euro area</b>	<b>52.0</b>	<b>1993</b>	<b>46.1</b>	<b>50.6</b>
Sweden	73.0	1993	52.5	55.6
United Kingdom	50.7	1981	44.0	52.1
Japan	41.0	1998	36.0	41.6
United States	37.2	1992	36.7	43.8

Source: European Commission, Autumn 2009, and Hauptmeier, Heipertz and Schuknecht (2007).

crisis and the aggregate revenue ratio in the euro area. In fact, it appears inconceivable that for the average of the euro area, the revenue ratio could be raised by 5 percentage points and reach 50 per cent of GDP to close most of the budget gaps via tax increases. As it stands, the revenue ratio did not decline much over the crisis (Table 14). Most of the fall has affected corporate income taxes due to a reversal of windfalls from previously booming asset markets, balance sheet losses and a decline in profits). Indirect tax revenue fell due to VAT cuts and possibly the downturn in the construction sector but more analysis would be needed.

Some modest adjustment is likely to come from the revenue side as temporary tax cuts are reversed, corporate income tax revenue recovers somewhat from the crisis trough and some indirect taxes are likely to be raised. However, an increase by 5 percentage point would imply that personal income taxes have to increase by half (50 per cent!) from less than 10 per cent to close to 15 per cent of GDP. Or receipts from social security contributions would have to increase

**Table 14**

**Total Public Revenue in the Euro Area**  
(percent of GDP)

	2007	2010	2007-2010
Total revenue	45.5	43.8	-1.7
Direct taxes	12.5	11.3	-1.2
<i>thereof: corporate</i>	3.3	2.2	-1.1
Indirect taxes	13.5	12.7	-0.8
Social contributions	15.2	15.4	0.2
Other	4.4	4.4	0.1

Source: European Commission, *Autumn Forecast* (corp tax=unweighted average).

by about one third. However, marginal and average tax rates in Europe are mostly already very high (Table 15). Further significant increases would be rather detrimental to employment and growth. Moreover, the literature has shown that mainly tax-based consolidations tend to be less successful (e.g., Guichard *et al.*, 2007; Afonso *et al.*, 2005).

More concretely, what does this imply? Expenditure ratios are currently unsustainable and need to come down significantly. Relative public wage and benefit

levels need to decline and the public sector reduce its commitments. A cut in total public expenditure by 10 per cent would yield savings of about 5 per cent of GDP; a cut in 20 per cent over time would be hardly unreasonable for a country with a deficit of 10 per cent of GDP and an expenditure ratio of 50 per cent.

Linking these claims with the findings of the second section, it should be recalled that expenditure adjustment needs to be based on the appropriate baseline. If indeed the crisis has reduced economic growth dynamics, even a real expenditure freeze may hardly generate enough adjustment and real if not nominal expenditure cuts will be needed. Assume a country with a 50 per cent expenditure ratio and 1.5 per cent trend growth. A real expenditure freeze would only yield about  $\frac{3}{4}$  percentage points of adjustment per year and a 5 percentage points adjustment would take seven years. A nominal total expenditure freeze would yield about 1.5 percentage points adjustment per annum. However, care needs to be taken that underlying commitments are cut commensurately via actual policy reforms.<sup>8</sup>

## 5 Conclusion

As to the experiences with fiscal activism in boom, crisis and beyond, the following simplified conclusions can be drawn: first, fiscal policies were overly imprudent in the boom phase preceding the financial crisis, partly due to real time measurement problems. In the bust phase, analysis into the roots of the crisis should have been deeper and too much emphasis was placed on the need for (activist) fiscal demand support. Although the balance sheet nature of the crisis was little acknowledged, significant fiscal measures to support balance sheets were introduced. Little attention has so far been paid to the fiscal dimension of economic restructuring and downscaling of demand that had reached unsustainable levels in the boom. While at the time of writing, fiscal exit

**Table 15**

**Marginal Tax Rates in Industrialised Countries, 2007**

Country	Single Earner, No Children, Average Income	Married, Two Children, Incomes of 100 and 67% of average income
United States	43.3	34.0
Japan	33.2	30.5
United Kingdom	40.6	46.5
Germany	66.5	63.4
France	55.8	52.0
Italy	52.7	52.7
Spain	45.5	45.5
<b>Euro Area (EU-15)</b>	<b>52.8</b>	<b>52.3</b>

Source: OECD (2008).

<sup>8</sup> Assuming inflation in line with the ECB's definition of price stability. Fiscal rules that maintain sustainable expenditure trends and underpin adjustment could increase the credibility of exit strategies (European Commission, 2007; Hauptmeier *et al.*, 2010).

strategies have been prepared and, in some countries, implemented in light of unsustainable fiscal balances, little attention has been paid so far to the importance of expenditure reform.

The previous discussion suggests a number of policy lessons and recommendations for fiscal activism:<sup>9</sup>

- In booms, remain actively prudent. Hence, anticipate measurement problems and base expenditure plans on prudent economic growth assumptions, underpinned by appropriate rules and commitments.
- In crisis, target the underlying problems. Provide a stimulus only in the deep crisis (demand shock) phase but weigh this against the risk of maintaining demand at unsustainable levels (especially if there were excesses in the boom). In fact, this risk may argue against much of a stimulus and even against the full operation of automatic stabilisers in certain cases. Provide balance sheet support in an appropriate manner. Support rather than prevent the restructuring of sectors that had reached unsustainable dimensions in the boom (e.g., construction/real estate and finance).
- Beyond the bust, implement appropriate fiscal exit strategies. As expenditure ratios have become unsustainable, given already high taxes and adverse growth implications, secure major reductions in the expenditure ratio. Adjust relative public wages and benefits and reduce other commitments of government commensurately. Build adjustment on an appropriately prudent baseline macro scenario.

Many observers have suggested implementing the fiscal exit rather later than too earlier. This approach is risky especially for large countries as it could make the global system uninsurable. It is also likely that many observers will emphasise the political difficulties of implementing an ambitious expenditure-based exit strategy. However, many countries have already gone through even greater, drawn out adjustment periods with primary expenditure cuts by more than 5 or even 10 per cent of GDP in the 1980s and 1990s. The experience has in fact been rather positive and virtuous cycles of fiscal adjustment, higher growth and faster balance sheet repair can emerge (see Hauptmeier, Heipertz and Schuknecht, 2007).

<sup>9</sup> There is also an important fiscal structural dimension for preventing future boom bust cycles the discussion of which goes beyond the scope of this paper. Fiscal policies should in particular not set undue incentives to invest in construction as crisis following real estate booms have proven to be particularly costly (Agnello and Schuknecht, 2009; Alessi and Detken, 2009). Moreover, fiscal policies should not encourage undue indebtedness and leverage in the household or corporate sector (IMF, 2009; European Commission, 2010). A gradual change in incentives in this regard would reduce the risk of future crisis.



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## THE REACTION OF FISCAL POLICY TO THE CRISIS IN ITALY AND GERMANY: ARE THEY REALLY POLAR CASES IN THE EUROPEAN CONTEXT?

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*The deep recession which hit the world economy towards the end of 2008 induced massive, internationally-coordinated policy responses, both monetary and fiscal. In this paper we examine public finance developments in Germany and Italy in 2009. We find that the larger stimulus measures adopted in Germany mostly compensated a more favourable underlying trend in the balance; overall, the cyclically-adjusted primary balances worsened by a similar extent in the two countries. We further estimate the automatic stabilisers to have had an impact on the deficit of similar magnitude in Germany and Italy. We then assess, on the basis of counterfactual simulations, to which extent discretionary measures and automatic stabilizers were able to mitigate the downturn in the two countries. Our results show that the public sector contrasted the fall in real GDP in 2009 by more than 2 percentage points in Germany and by 1 per cent in Italy. The difference in the stabilizing effect of the two public sectors reflects not only the different size of the stimulus measures, but also the higher fiscal multipliers associated with Germany.*

### 1 Introduction

At the end of 2008, when the worldwide recession began, public finances in Italy and in Germany were strikingly different. The level of public debt was close to 106 per cent of GDP in Italy and as much as 40 percentage points lower in Germany. Furthermore, the former country posted a deficit already close to the Maastricht threshold (2.7 per cent of GDP), while Germany's budget was exactly balanced.<sup>1</sup> The main public finance aggregates showed relatively minor differences, with the revenue ratio and the primary expenditure ratio in Italy being higher by almost 2 percentage points. Section 2 below examines to what extent the differences in fiscal positions in 2008 depended on the policies implemented by Germany and Italy since 1997 – the year relevant for qualification to participate in the Monetary Union.

Given their fiscal conditions in 2008, it is not surprising that the size of the discretionary measures adopted by the two countries facing the looming recession were at the extremes of the range spanned by the reactions of all European governments.<sup>2</sup> The gap in the debt levels took particular relevance in the context of the widening of the spreads between government bonds in the last months of 2008, which warned that sizeable expansionary fiscal action in Italy would result in higher financing costs. For Germany, on the contrary, additional public borrowing was not perceived to increase the pressure on interest rates.

The timing, magnitude and composition of the stimulus actions adopted in Germany and Italy for 2009 and 2010 are examined in Section 3. The comparative analysis for 2009 shows, *inter alia*, that the larger deficit-increasing impact of the measures adopted in Germany mostly compensated a more favourable underlying development in the balance in that country. Compared to Germany, the Italian fiscal actions intervened more on the composition of the budget in order to

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<sup>1</sup> The difference in the overall balance was due to higher interest payments in Italy, while the level of the primary balance was roughly the same in the two countries.

<sup>2</sup> European Commission (2009), Table I.1.1, p. 14.

stimulate the economy, while limiting the short-term effects on the deficit. The budgetary impact of automatic stabilizers is found to be largely similar. Going forward, the picture for 2010 seems more clear cut. While the deficit ratio in Italy is expected to improve marginally, for Germany it is projected to rise by  $\frac{3}{4}$  percentage points, reflecting further sizeable stimulus measures which are only to a limited extent offset by a positive impact from the cycle.

In Section 4 the effects of the stimulus measures and the automatic stabilizers on the Italian and German economies in 2009 are assessed on the basis of counterfactual simulations of the econometric models used, respectively, in the Bank of Italy and in the Deutsche Bundesbank. We find that, overall, general government developments limited the fall in real GDP in 2009 by more than 2 percentage points in Germany and by 1 point in Italy. This gap reflects both the different size of the stimulus measures in the two countries and the higher fiscal multipliers estimated for Germany.

Section 5 concludes.

## 2 Fiscal policies before the crisis: from 1998 to 2008

Between 1997 and 2008, the general government deficit in Germany and Italy followed separate paths: while it turned from a deficit of 2.6 per cent of GDP into a marginal surplus in the former country, it remained stable in the latter, at 2.7 per cent of GDP. In the same period, the Italian public debt declined by 11.7 percentage points, to 106.3 per cent of GDP, while that of Germany rose by 6.6 percentage points, to 66.3 per cent (Figure 1).

In this period, German and Italian fiscal policies did not fully comply with the European fiscal criteria. The net borrowing in both countries exceeded for four years in a row the 3 per cent of GDP limit set by the Treaty on the Functioning of the European Union (TFEU). The excessive deficits occurred at the beginning of the decade, in the context of a recession which can be deemed at most mild – particularly from today’s standpoint. As for the limit indicated in the Treaty for public debts (60 per cent of GDP), after 2002 Germany’s debt consistently exceeded the threshold, with a clear upward trend. In the case of Italy, given the very high starting condition, the modest reduction in the debt ratio did not meet the Treaty provision that it be “sufficiently diminishing and approaching the reference value at a satisfactory pace”. Moreover, approximately two thirds of the reduction were due to extraordinary operations (debt restructuring and sale of assets) which left the public sector net wealth unchanged (Momigliano and Rizza, 2007). Finally, precisely in view of its high debt level, Italy had vowed (at the ECOFIN Council held in York in March 1998; *Corriere della Sera*, 1998) to achieve a rapid convergence towards the Treaty benchmark debt level, by maintaining a primary surplus equal or above 5 per cent of GDP. Had this commitment been met, *ceteris paribus*, in 2008 the debt level would have been close to 80 per cent of GDP.

Developments in primary balances are reported in Figure 2 (left panel; data adjusted for cyclical effects<sup>3,4</sup> and temporary government measures are shown in the right panel).

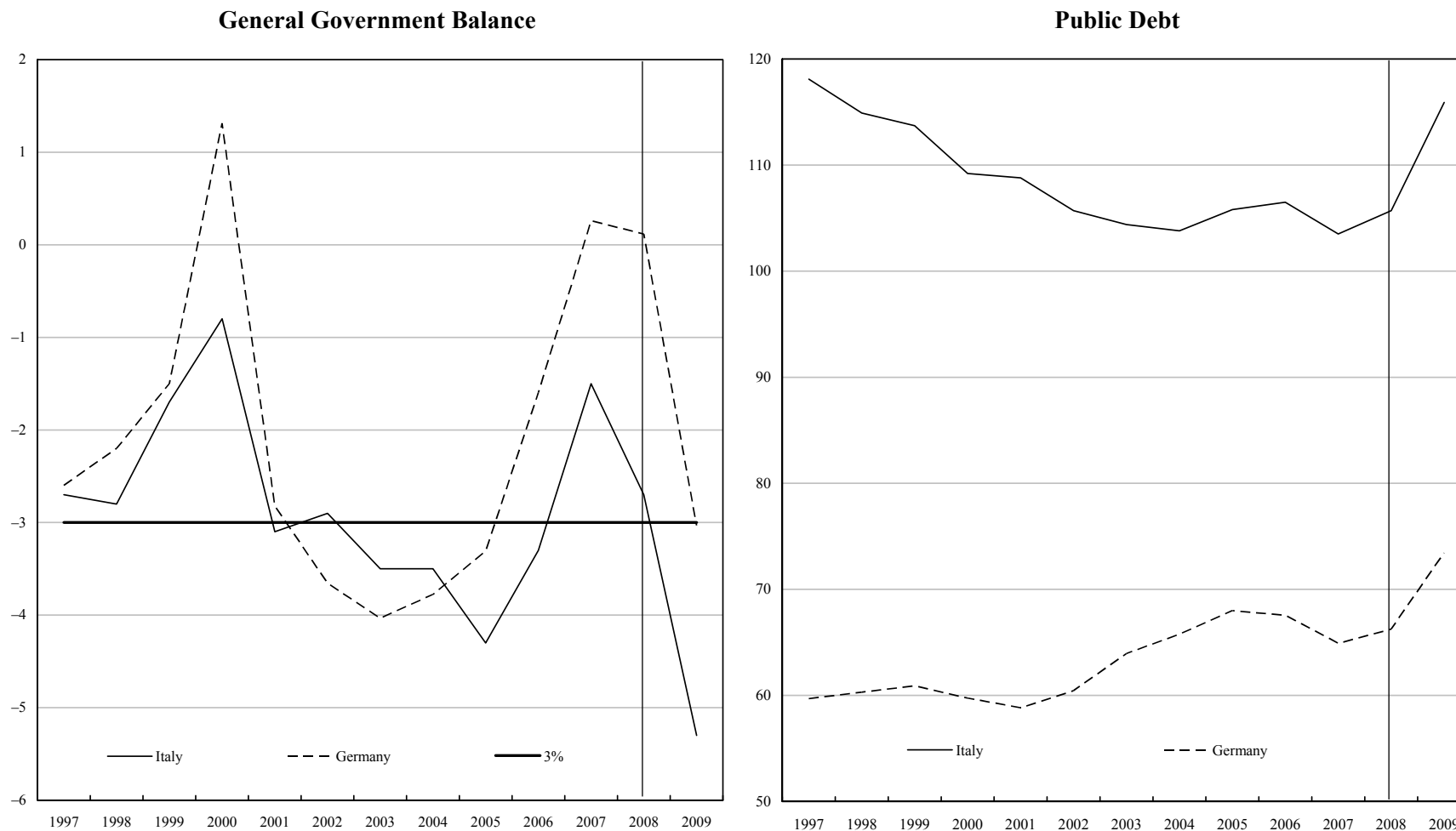
Excluding interest payments from the balance (see Figure 2, left) does not affect the analysis for Germany, as this budgetary item remains largely unchanged in the period. For Italy, instead, the examination of the primary balance unveils a rapid and almost continuous deterioration between

<sup>3</sup> Data were adjusted using the methodology developed within the European System of Central Banks (see Bouthevillain *et al.*, 2001; Kremer *et al.*, 2006a, and, for applications of the method in Germany and Italy, Kremer and Wendorff, 2004; Kremer *et al.*, 2006b; and Marino *et al.*, 2008a and 2008b).

<sup>4</sup> These effects are usually the most important transitory factors, but we are still far from capturing the influence of all temporary factors on public finances. Other temporary factors with an impact on revenue include fluctuations in interest rates and in prices of real estate, stocks and oil.

**Figure 1**

**General Government Net Borrowing and Public Debt**  
(percent of GDP)

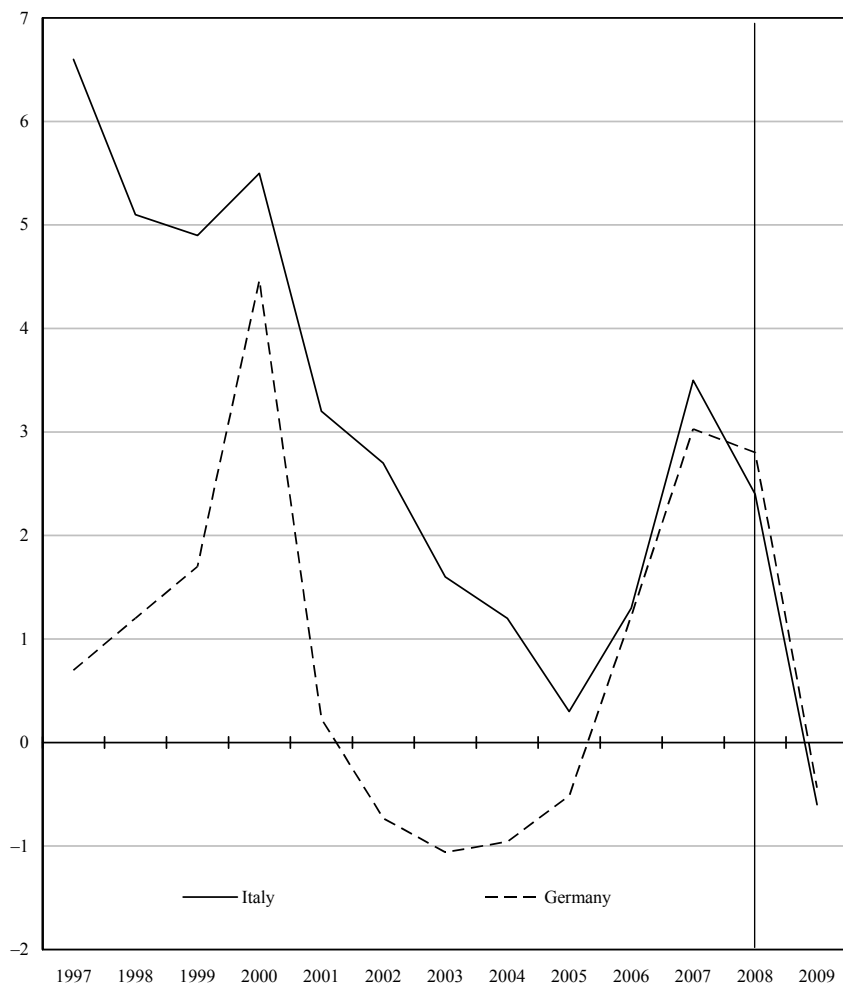


Note: The balances and the dynamics of the debt in 2000 were influenced by the extraordinary proceeds from the sale of UMTS licences (2.4 and 1.2 per cent of GDP, respectively, in Germany and Italy).

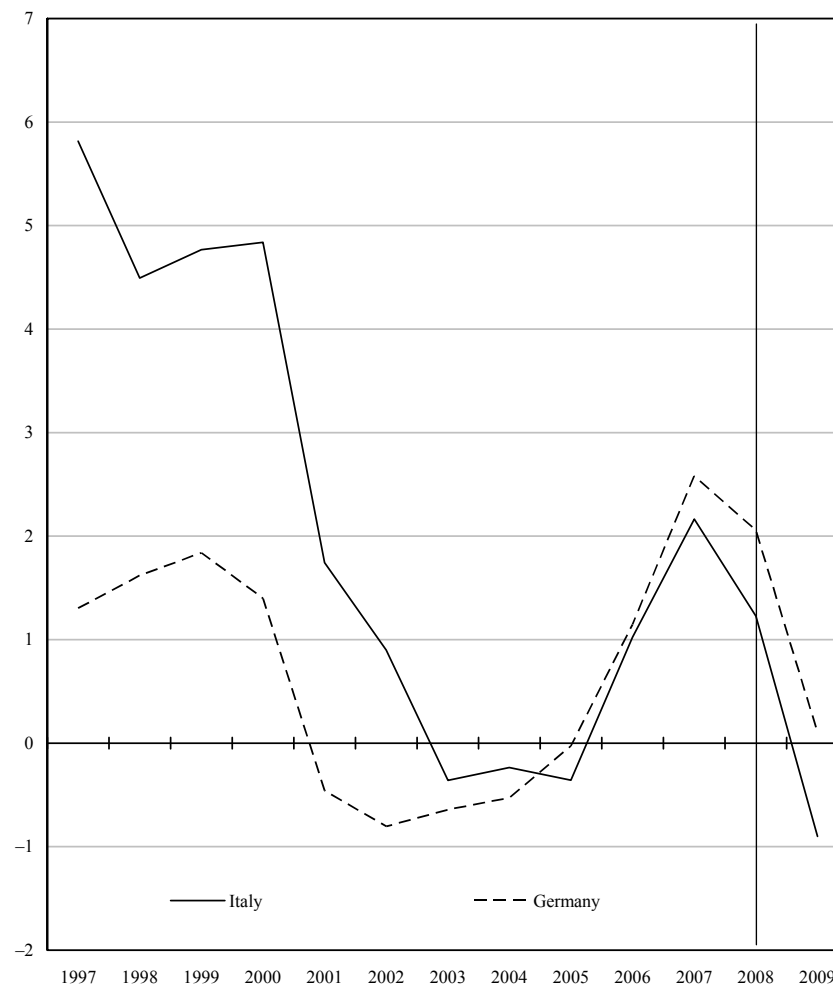
**Figure 2**

**General Government Primary Surplus**  
(unadjusted and structural)

**General Government Primary Surplus**  
(percent of GDP)



**Structural Primary Surplus**  
(percent of trend GDP)



1997 – when it stood at 6.6 per cent of GDP – and 2005, when it was virtually nil.<sup>5</sup> After 1997, Italian public finances progressively benefited from the fall in rates which occurred after joining the Monetary Union. However, interest payments savings did not result in an improvement in the balance; rather, they were largely used to reverse the increases in revenue and cuts in health and capital expenditure which had taken place in the fiscal adjustment of the years 1992-97 (Degni *et al.*, 2001; Balassone *et al.*, 2002, Marino *et al.*, 2008a).

The path of the structural primary balance (*i.e.* adjusted for the effects of the cycle and temporary measures) in the two countries broadly confirms the analysis above. However, a few remarkable differences are apparent. First, the worsening trend in Italy ends two years earlier than shown by the unadjusted primary balance, approximately in 2003, when the gap in the structural primary balance between the two countries also closes. Second, Italy and Germany appear to have followed largely similar fiscal policies in the following years, as their structural primary balances move closely together. As will be seen when we turn to 2009, the fiscal stance of the two countries remained similar last year too.

In Figure 3 we show the development of revenue and primary expenditure in the two countries, adjusted for the effects of the economic cycle and temporary government measures. We find a striking difference between the two countries in the dynamics of the structural primary expenditures (as a ratio to trend GDP): in 1997 this aggregate was 3.5 percentage points higher in Germany than in Italy, while 11 years later it was lower by over 1.5 percentage points. This reversal is due for  $\frac{3}{4}$  to the increase in the Italian expenditure ratio and for  $\frac{1}{4}$  to the decline in that of Germany. Large differences can be found for social expenditures (which increased by 2 percentage points of trend GDP in Italy, while they declined by 0.3 in Germany) and public wages and salaries (which in Italy increased by 0.2 percentage points while in Germany they declined by 1 pp).<sup>6</sup> In Marino *et al.* (2008b), the increase in structural Italian expenditures between 1997 and 2007 is largely attributed to the strong dynamics of health and capital expenditures. In Germany, the decline in the ratio between social payments and trend GDP started in 2003, following comprehensive reforms of the welfare system. The dynamics of German public wages and salaries remained subdued over the whole period, reflecting the decline in the number of government employees and the moderation in wage agreements (with the agreements being systematically lower than in the private sector). As for the structural revenue ratio, it dropped by approximately 2 percentage points in both countries, with the Italian ratio remaining higher than the German one by about 1 percentage point. For both countries the increase in 2006-07 is driven by unexpected revenue windfalls, largely concentrated in profit-related taxes, and legislative measures.

Summing up, public sector developments in Germany and Italy between 1998 and 2008 show both similarities and differences.

First, both countries clearly failed to fully comply with the European fiscal criteria, for both deficit and debt. However, in the later years overall and primary balances improved more in

<sup>5</sup> In this paper we consider the budget balance definition which is relevant for the excessive deficit procedure, *i.e.* the general government balance including the effects of swaps and forward rate agreements. Furthermore, for an homogeneous comparison, the general government revenue and expenditure are defined according to the criterion adopted by the EU (Regulation EC/1500/2000, relevant for the updates of the stability programme), which differs from the “traditional criterion” used in the national accounts published by the Italian National Institute of Statistics (ISTAT).

<sup>6</sup> In nominal terms, in the period 1998-2008 the average growth of unadjusted primary expenditure in Italy is 4.8 per cent, against 1.7 per cent in Germany. The gap shrinks only marginally in the last years: in the period 2004-08 the average growth declines in both countries to, respectively, 3.5 per cent and 0.8 per cent.

Figure 3

Structural Revenue and Primary Expenditure  
(percent of trend GDP)

Britta Hanburg, Sandro Momigliano, Bernhard Mancke and Siegfano Siviero

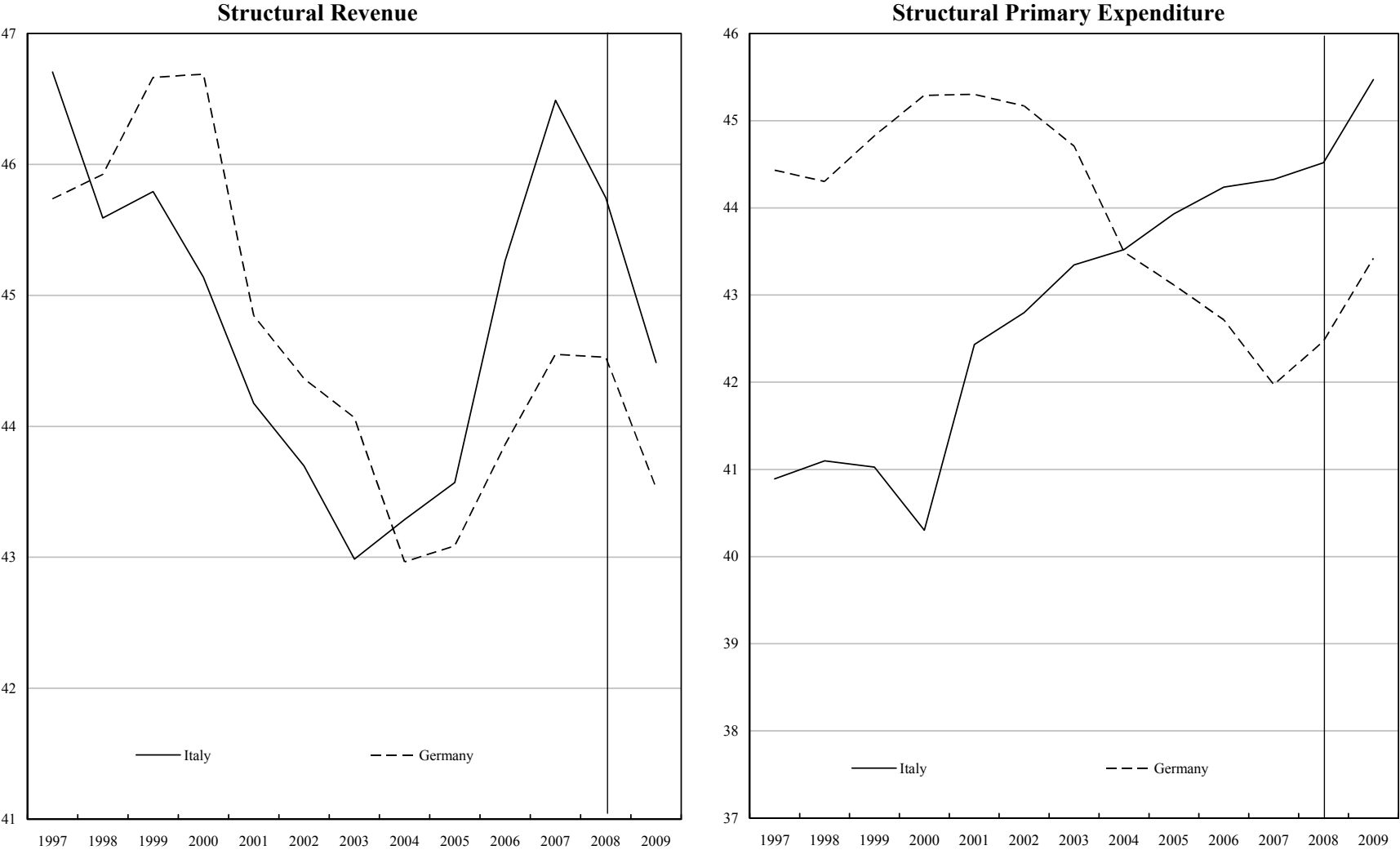
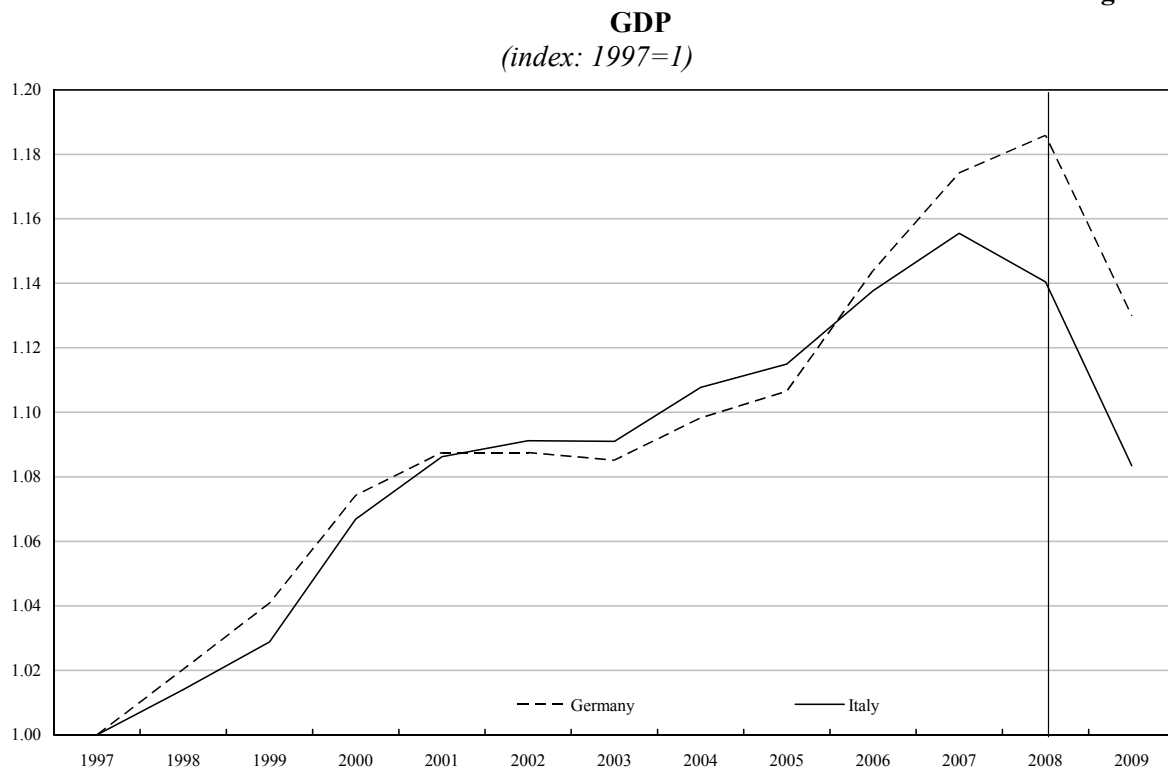




Figure 4



Germany, reflecting to a large extent the higher growth of 2007-08 (Figure 4).<sup>7, 8</sup> As a consequence, in 2008 Germany was in a far better position to cope with the recession. Nevertheless, even the German fiscal margin at end-2008 was not fully adequate, given the depth of the 2009 recession.

Second, in terms of primary balance and expenditure – two key indicators for assessing the soundness of public finance – the performance of the two countries was strikingly different. While Italy completely dissipated the Maastricht dividend of lower interest rates on higher primary expenditures (and, to a lesser extent, lower revenues), Germany achieved a substantial reduction in primary expenditure, which resulted in an improvement of the primary balance in spite of falling revenues.<sup>9</sup>

The structural deterioration of Italian primary balance essentially occurred in the years 1998-2003. In the following 5 years the levels of the structural primary balances in the two countries moved together, indicating that Italy and Germany adopted broadly similar policies.

### 3 The fiscal response to the crisis

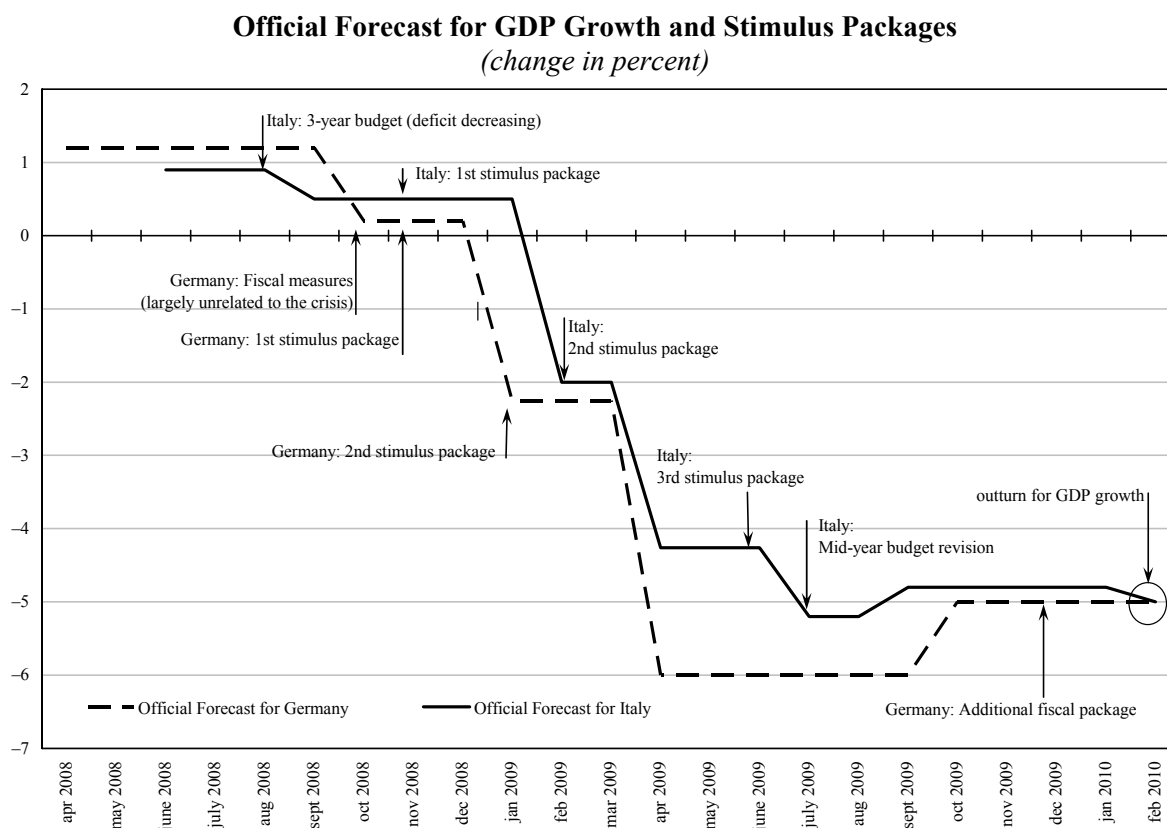
The first clear fiscal reaction to the crisis took place in November 2008 in both Italy and

<sup>7</sup> Between 1997 and 2006 the cumulated growth of the two countries is almost identical, while in the following two years in Italy it is a mere 0.2 per cent, while in Germany it amounts to 3.8 per cent.

<sup>8</sup> The different fiscal position of the two countries in 2008 was also influenced by the German better structural performance in 2005.

<sup>9</sup> The decline of the revenue ratio seems to have been largely caused by a negative decoupling of growth of important macroeconomic assessment bases from GDP growth whereas legislative changes are positive and a substantial fiscal drag has accumulated in the period.

Figure 5



Germany, after the sudden, dramatic escalation of the financial market turmoil, with both countries issuing an emergency stimulus package.<sup>10</sup> In the previous months, a number of fiscal measures had been adopted which were unrelated to the looming crisis. In August, Italy had approved a deficit-reducing three-year budget, with an impact on net borrowing estimated at 0.6 per cent of GDP in 2009 (1.0 per cent in 2010).<sup>11</sup> In October, Germany had introduced a number of measures with a combined deficit-increasing effect amounting to 0.3 per cent of GDP for 2009 (0.6 per cent in 2010).<sup>12</sup> As shown in Figure 5, when these decisions were taken, GDP growth projections, though not particularly favourable, were still positive for both countries.

The measures taken by Germany and Italy before November went into the direction of aligning the fiscal stance for 2009 in the two countries, offsetting the divergent trend of their budget balances which would have occurred in a no-policy-change scenario. Early in November, the European Commission's assessment of macroeconomic and budgetary developments for 2009 was almost identical for the two countries: in both Germany and Italy real GDP was expected to stagnate and the deficit was envisaged to worsen by 0.2 percentage points of output (European Commission, 2008). *Ex post* data for 2009 seem to show that the pre-November policies were not able to fully close the divergent trend of the budget balances in the two countries, as explained further on.

<sup>10</sup> Prior to that, both governments (and particularly the German one) had taken action, together with monetary policy authorities, to contribute to avert the collapse of their respective financial systems.

<sup>11</sup> The three-year budget was basically confirmed in the Finance Bill for 2009, presented to the Parliament at the end of September.

<sup>12</sup> Indeed, the enlarged deductibility of insurance contributions as of 2010, which of all these measures has the largest deficit impact, followed from an earlier ruling of the constitutional court.

The Italian stimulus package introduced in November included transfers to low-income households and, on a smaller scale, relief measures for enterprises. According to government estimates, those measures were fully financed by revenue increases, mainly by means of the introduction of a voluntary substitute tax on asset re-evaluations and, to a lesser extent, by means of expenditure cuts.<sup>13</sup> The German stimulus package, by contrast, was estimated to increase the deficit by 0.2 per cent of GDP in 2009 and 0.3 per cent in 2010.<sup>14</sup> It consisted mainly of additional public investment, a temporary reintroduction of declining-balance depreciation for machinery and equipment, and an extension of tax deductions allowed for handicraft services.

In December 2008 the European Council called on member states to coordinate the fiscal response to the crisis by implementing a European Economic Recovery Plan which recommended a budgetary stimulus of 1.5 per cent of GDP cumulatively for 2009 and 2010 (1.2 per cent of GDP by member states and 0.3 per cent at the EU level). The stimulus was required to be TTT (temporary, timely and targeted). Moreover, countries with more fiscal room for manoeuvre were asked to provide a larger fiscal stimulus than countries with a less favourable starting position. The decision of the European Council called on Germany – until then reluctant to expand its budget – to do more to sustain the economy, while giving political support to the prudent attitude adopted by the Italian Government.

Around the turn of the year it became increasingly clear that not only countries with bubbles in the housing markets and low competitiveness would be severely affected by the global downturn, but also – or even especially – open economies with a large share of investment and durable consumption products in their exports. The latter description fits perfectly Germany and, to a lesser extent, Italy as well; the strong economic ties between the two countries made it also likely that their destinies in the upcoming recession be closely linked.

The rapid deterioration of macroeconomic prospects (Figure 5) induced both countries to implement a second stimulus package shortly after the first. This time Germany reacted first, in January 2009, and with a far larger intervention, whose estimated impact on the 2009 deficit amounted to 0.7 per cent of GDP (1.1 per cent in 2010). The main measure was an increase in public infrastructure investments; the package also included income tax reductions and a reduction of the contribution rate to the statutory health insurance. Various measures to dampen the labour market effects of the crisis were put in place, most importantly additional support for short-time work. Transfer payments to households were increased, mainly through a one-off child bonus to be paid in the Spring. The provisions included a temporary car scrapping premium paid to households (extended in April). The second Italian fiscal package was passed in February 2009; it too included a similar car scrapping incentive, financed partly by closing some tax loopholes and partly by the higher tax revenue expected from the increase in car purchases induced by the measure.

The synchronization of the fiscal reaction in the two countries ends with the second stimulus package. In June, amid signs of a worldwide easing of the recession but in the presence of a steady and worrisome deterioration of the labour market, the Italian government approved an additional anti-crisis decree – designed once again to be neutral on the budget balance – which included provisions aimed at strengthening the social safety net and, most notably, introducing large tax incentives for purchases of machinery in the following 12 months. Furthermore, the mid-year budget revision in July included temporary boosts to intermediate consumption and public investment. These measures entailed a 0.3 percentage points of GDP impact on the public balance for 2009; this being the only deficit-increasing package to be approved throughout the crisis. The budget for 2010, passed by the Parliament at the end of December 2009,<sup>15</sup> once again included

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<sup>13</sup> As the revenue from the substitute tax was higher than expected, overall the package is likely to have reduced the deficit *ex post*.

<sup>14</sup> The figures on the fiscal impact of the various measures reflect government estimates and our own assessment.

<sup>15</sup> The budget was partly anticipated, as in 2008, by a decree (No. 112) in the Summer.

expenditure increases (amounting to 0.2 per cent of GDP), financed by an extraordinary tax (the so-called “tax shield”),<sup>16</sup> with an estimated zero effect on the balance.

As for Germany, only in December of 2009 did the newly-elected government pass an additional fiscal package with the objective of providing a further stimulus and fostering long-run growth.<sup>17</sup> The measures included a further increase in child benefits, reductions of enterprise and inheritance taxes and a lower VAT rate for accommodation services, which accompanied a temporary grant to the health fund. In total, the impact of the package on the budget balance in 2010 was estimated at 0.4 per cent of GDP.

Summing up, if we include all actions taken since the summer of 2008, in Italy discretionary measures improved the budget balance by 0.3 per cent of GDP in 2009 and by approximately 1.0 in 2010 (reflecting the restrictive measures taken before the crisis exploded, only partly offset by deficit-increasing measures issued in late 2009), while in Germany fiscal policies worsened the balance by respectively 1.3 and 2.5 per cent of GDP.<sup>18</sup>

In our analysis we focus on the crisis-motivated discretionary measures taken since November 2008.<sup>19, 20</sup> In our assessment these measures have led to a fiscal loosening far greater in Germany (with an impact on the deficit amounting to 1.1 per cent of GDP in 2009 and about 2 per cent in 2010) than in Italy (0.3 and basically zero, respectively, for the two years).<sup>21, 22</sup> While official figures for 2009 are available, for 2010 they obviously are not. Our estimates for this year should thus be treated with particular caution; this is one of the reasons why most of our empirical results in Section 4 focus on 2009.

Obvious reasons led Italy to a more prudent behaviour, among which the worse starting position for both deficit and debt. The different *ex ante* orientation of fiscal policy may also reflect differing real-time expectations concerning the size of the downturn. As shown in Figure 5, in the first months of 2009 the worsening of the outlook was more pronounced in Germany than in Italy. Finally, budgetary rules in Italy do not allow for deficit-increasing packages except in the case of the Finance Bill. Therefore, after the budget for 2009 had been passed in December 2008, the Italian government had little leeway (until the mid-year budget revision) to introduce expansionary measures in response to the deteriorating growth outlook. In contrast, in Germany two

<sup>16</sup> The revenue which in October 2009 was expected to be raised in December from the foreign assets disclosure scheme (0.25 per cent of GDP) was shifted from 2009 to 2010 by reducing the size of the advance personal income tax payment due at the end of 2009. *Ex post* the revenue from the scheme was slightly higher than expected (less than an additional 0.1 per cent of GDP) and the additional receipts improved the balance in 2009.

<sup>17</sup> Minor relief measures for enterprises were adopted in July 2009, with an effect on the deficit in 2009 lower than 0.1 per cent of GDP.

<sup>18</sup> Measures that do not have an (immediate) impact on the general government deficit like guarantees or off-budget measures (especially in the context of support for the financial sector) are not included in this analysis although they might have a significant impact on macroeconomic variables.

<sup>19</sup> The reintroduction of the commuters allowance in Germany (which followed a ruling by the Constitutional Court in December 2008) and the actions taken following the earthquake in Abruzzo in April 2009 in Italy are also excluded, by referring to the stated intention of the governments.

<sup>20</sup> The reasons for focusing on the measures taken since November 2008 are the following. First, the fiscal packages introduced before were publicly motivated by reasons different from the economic crisis (e.g., consolidation for Italy). Second, these actions were decided when GDP growth projections for both countries were still positive.

<sup>21</sup> The estimated effects of the discretionary measures reflect a number of positive and negative adjustments to the original official estimates of the fiscal packages. For Italy, for 2009 and 2010 these adjustments broadly balance out. With regard to 2009, on the one hand, the revenue from the voluntary substitute tax on asset revaluations was higher than originally expected (0.4 per cent of GDP, instead of less than 0.2 per cent), likewise the proceeds of the “tax shield” exceeded the resources shifted to 2010 by 0.07 per cent of GDP. On the other hand, a number of financing instruments seem likely to have been less effective than originally expected. For Germany, the additional public investment included in the stimulus programmes is assumed to be implemented with substantial delay compared to the initial government plans.

<sup>22</sup> Our assessment is not significantly different from that presented in European Commission (2009), p. 14. The figures provided there do not include more recent measures.

**Table 1****Fiscal Policy In Italy and Germany in 2009***(change in ratio to GDP in percentage points with respect to 2008) (deficit-increasing: +)*

	<b>Italy</b>	<b>Germany</b>
All Measures ( <i>percent of GDP</i> )	−0.3	+1.3
Stimulus Measures ( <i>percent of GDP</i> )	+0.3	+1.1
Automatic Stabilizers	+1.4	+1.6
Other Changes in Primary Balance	+1.4	+0.5
Overall Change in Primary Balance	+3.1	+3.2

supplementary deficit-increasing budgets were adopted in the course of 2009 at the central level; similar actions were taken at the regional level.

By focusing exclusively on discretionary fiscal measures, however, the assessment of the stabilising role of fiscal policy may well be significantly distorted, particularly in the context of cross-country comparisons.<sup>23</sup>

Firstly, macroeconomic fluctuations are dampened by automatic stabilizers. With regard to Italy and Germany in 2009, however, including the impact of the latter (estimated on the basis of the method presented in Bouthevillain *et al.*, 2001) does not fundamentally change the relative ranking of the two countries, as they are of almost equal size in both (Table 1).

Secondly, focusing exclusively on discretionary measures leads to neglecting the fact that differences in the existing legislations may imply divergent trajectories for the budget balance, even if the macroeconomic environment is the same for both countries. Therefore, for example, restrictive discretionary measures in one country may simply compensate for a larger – in relative terms – trend growth of expenditure under existing legislation.

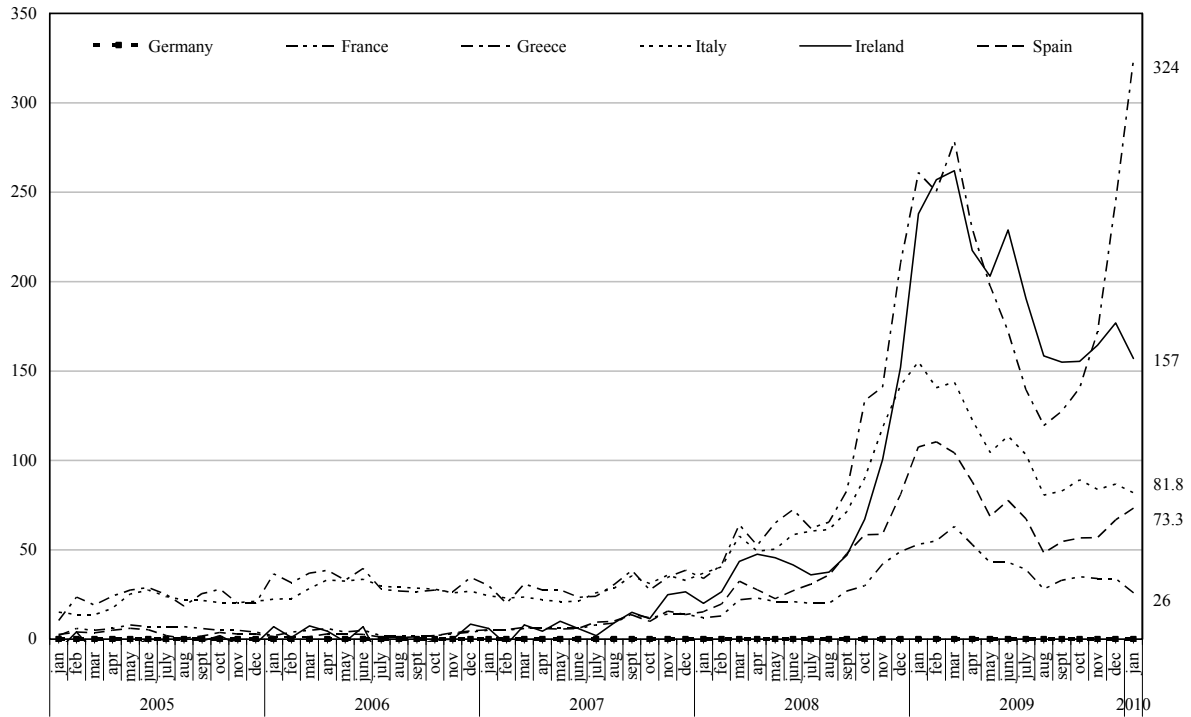
One way to deal with this shortfall is to look at changes in the cyclically-adjusted primary balance (CAPB, *i.e.*, the budget balance net of cyclical effects), as this takes simultaneously into account the effects of discretionary measures and of other structural changes. This indicator, commonly used to assess the fiscal stance of one country, also shows an almost equal loosening in the two countries (a worsening of 1.6 per cent and 1.7 per cent respectively in Germany and in Italy).

This finding – which suggests that caution should be exercised when comparing the fiscal policies of the two countries – appears to be attributable, to a large extent, to the relatively strong growth in pension expenditure and larger revenue shortfalls in Italy. It may also be related to the fact that the two governments not only had good reasons to react differently to the crisis, but also that they could reap some short-term benefits by simply pretending to do so. The Italian government had an incentive to tone down as much as possible any expansionary orientation of the

<sup>23</sup> See De Castro, Kremer and Warmedinger (2010).

Figure 6

**Interest Rate Spread of Ten-year Government Bonds Versus Germany**  
(basis points)



budget in order to limit adverse financial market reactions. In fact, the spreads on ten-year Italian government bonds *vis-à-vis* German bunds increased to around 150 basis points in early 2009, before gradually falling below 100 points already in the Summer (Figure 6). On the other hand, EU countries with worse fiscal starting positions were putting pressure on Germany to act, thus providing the German government with a political incentive to put as much emphasis as possible on the expansionary measures that it issued.

Concerning the composition of the discretionary measures (Figure 7), there are important differences between the two countries. First, while German measures are essentially all deficit-increasing, those adopted in Italy include also deficit-reducing interventions. The financing side of the Italian stimulus measures is essentially based on two capital taxes, both due on a voluntary basis:<sup>24</sup> a substitute tax on asset revaluations and (for the part of its receipts which was not shifted to 2010) a tax on assets held abroad illegally. While the recourse to these taxes, compared to more standard revenue increases, has limited the negative impact on the consumption and investment decisions of private agents, enhancing the overall stimulus of the fiscal package (see Section 4, below), it will have large costs in 2010 and the following years. The substitute tax on asset revaluations will cumulatively reduce revenue in the decade 2010-19 by 0.9 per cent of 2009 GDP, approximately twice as much as the receipts obtained last year. Second, the role of tax reliefs is much more important in the German stimulus packages than in those of Italy. As regards expenditure, the measures taken by Germany are only slightly larger (0.7 per cent of GDP versus 0.44 for Italy).

<sup>24</sup> There were also numerous reductions in expenditure or increases in revenue, with a generally negligible impact.

Figure 7

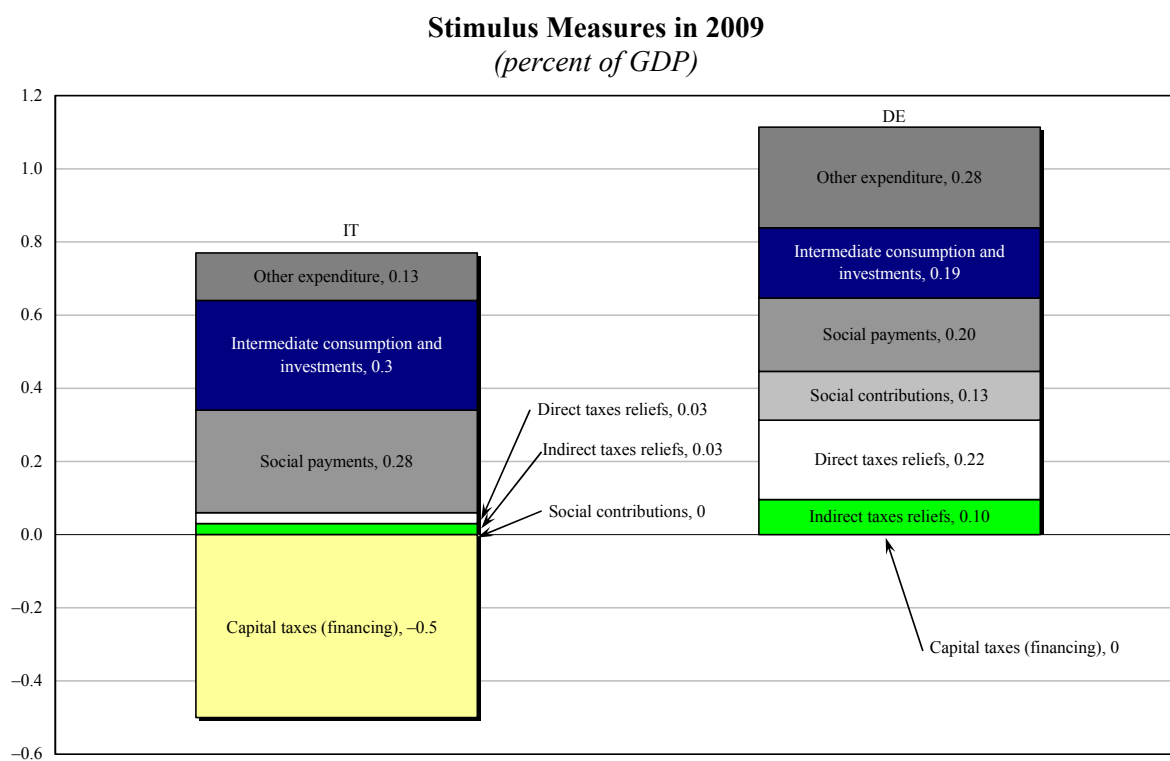
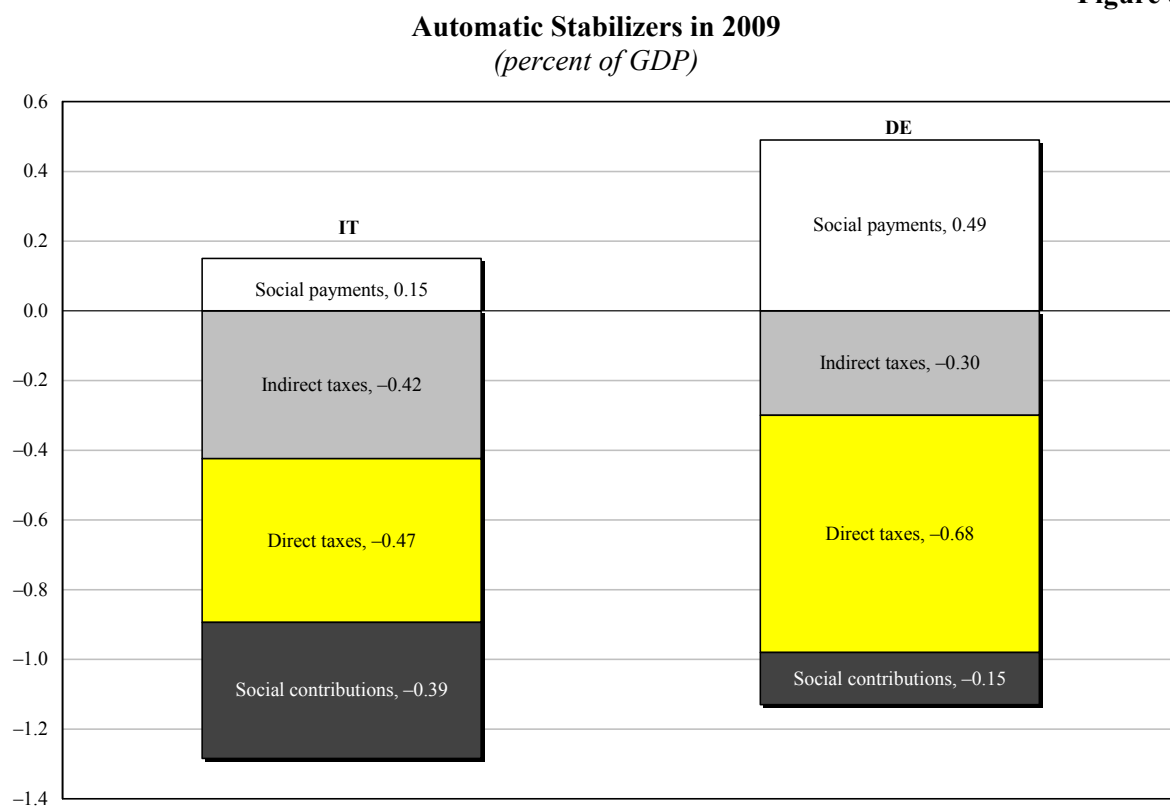


Figure 8



While the size of the automatic stabilizers is comparable in the two countries, the channels through which they operate are somewhat different. In particular, the automatic increase in unemployment-related transfers were much larger in Germany (reflecting its more generous and comprehensive social safety net), while the fall in social security contributions was greater in Italy, reflecting the stronger impact of the crisis on the labour market.

Going forward, the preliminary picture for 2010 seems more clear cut. While the European Commission in its autumn forecast expects the Italian (primary) deficit ratio to improve marginally, for Germany it is projected to rise by  $\frac{3}{4}$  percentage points, reflecting further sizeable stimulus measures which are only to a limited extent offset by a positive impact from the cycle.<sup>25</sup> The deficit reduction projected for the coming years on a no policy change assumption is somewhat stronger for Germany than for Italy. While Germany is projected to reduce its deficit ratio by close to 2 percentage points a  $1\frac{1}{2}$  percentage point reduction is foreseen for Italy. This implies that Italy needs to take additional consolidation measures to comply with the Council recommendation to correct its excessive deficit by 2012 while, without further measures, Germany would reduce its deficit ratio below the 3 per cent threshold by 2011, two years ahead of the 2013 deadline.

#### **4 Discretionary measures, automatic stabilizers, neutral budget benchmark, and their impact on economic activity**

To appraise the impact of the budget on economic activity in Germany and Italy for 2009 we use the respective central bank's econometric model (BbkM for Germany and BIQM for Italy)<sup>26</sup> and compare historical developments against three counterfactual exercises:<sup>27, 28</sup>

- 1) a simulation in which discretionary fiscal stimulus measures are removed; compared to history, this simulation provides an estimate of the impact of discretionary interventions in response to the crisis;
- 2) a simulation in which, in addition to fiscal stimulus measures, cyclical effects are removed too; comparing this simulation with the previous one we get an estimate of the impact of the automatic stabilizers; moreover, it allows us to appraise the effectiveness and, in a way, the short-term cost-efficiency of the policies which were actively pursued, against those associated with the automatic stabilizers.
- 3) finally, a simulation in which all items of the general government budget (excluding interest payments) remain at the same level as in 2008, in relation to trend GDP. Further details on the design of this simulation are reported in Appendix 2. The results of this simulation provide a

<sup>25</sup> According to the Commission forecast, the positive impact of the cycle on the budget balance/GDP ratio for Germany in 2010 amounts to more than one percentage point. According to the ESCB approach to cyclical adjustment which takes into account the composition of growth (which is unfavourable for public finances in 2010) it is much smaller.

<sup>26</sup> For a short presentation of the models used and references to more detailed descriptions, see Appendix 1. For the design of the simulations, see Section 3.

<sup>27</sup> Of course, all analyses aiming at appraising the effects of a change in policy are subject to the well-known logical flaw which affects all evaluation of policy measures conducted on the basis of relationships found to hold under a different policy set-up (Lucas, 1976). There are, however, several reasons to believe that in practice the Lucas Critique may be less disruptive than one could think: (i) the behaviour of economic agents may be backward-looking rather than forward-looking; this may be tested empirically (Hendry, 1988; Favero and Hendry, 1992); (ii) even if the agents' expectation formation process is assumed to be forward-looking, the possibility exists that, because of the indeterminacy of the equilibrium, one may still specify rational and "Lucas-proof" decisional rules (Farmer, 1991); (iii) the institutional changes or policy measures in question may not be the "regime shifts" necessary for the Lucas Critique to apply (Sims, 1982); this remark arguably applies to the case at hand; (iv) even if each individual agent were to modify her/his decisional rule as a consequence of a policy regime shift, the aggregation of heterogeneous reactions may result in an aggregate response that is much less pronounced than each of the underlying individual reactions, so that the actual, aggregate macroeconomic effects of a policy change may be better approximated by an approach that disregards the inherent non-structurality (Altissimo, Siviero and Terlizzese, 2002).

<sup>28</sup> As is normally the case, all residuals and add-factors underlying the baseline simulation ("history") were used in all counterfactual simulations as well. A description of the ceteris paribus assumptions underlying all simulations is given in Appendix 3.



“neutral” benchmark providing an indication of what might have happened in an economy with a fully sterilized public sector.

All possible care was exercised to guarantee that the simulation design was exactly the same for both countries. However, the possibility cannot be ruled out that the differences between the two national models reflect not only genuine differences in the respective country’s characteristics – reflected in the models’ different parameter values – but also, at least in part, different modeling strategies underlying the construction of those models, despite the broad similarities in their general features (see Appendix 1).

Also, while the fiscal multipliers appear to be much higher in the model for Germany (consistent with previous literature),<sup>29</sup> there are reasons to believe that, in the case of the specific episode we explore, the actual multipliers associated to changes in the public budget may have been different than in the (average) historical experience. On the one hand, in this exceptionally severe recession, increases in disposable income due to fiscal measures might have resulted in larger-than-usual increases in precautionary savings. Moreover, a more Ricardian reaction than in the past could be induced by higher (expected) debt ratios and fiscal risks from financial sector support (IMF, 2009) and by wealth losses suffered during the crisis. On the other hand, a less pronounced deterioration in public finances would have arguably implied lower interest risk premia (most plausibly in the case of Italy), and therefore higher multipliers, than estimated in our simulations, in which interest rate have been kept unchanged (see Appendix 3 for the treatment of interest rates in counterfactual simulations).

Finally, while we do not appraise the cross-country effects of public sector developments, they are likely to have been non-negligible, given the close trade ties between the two countries.

#### 4.1 The results

The estimated effects of the fiscal stimuli are reported in Table 2.

Discretionary stimulus measures have resulted in an increase in the deficit to GDP ratio of 0.8 percentage points in Germany, but of only 0.2 point in Italy. This result includes the cost of discretionary measures (see the discussion in Section 3) as well as the retroaction on the budget of their effects on the economy. In terms of impact on economic activity, the gap between the two countries narrows significantly: the boost which German GDP received from fiscal stimulus measures<sup>30</sup> in 2009 is estimated to amount to 0.8 percentage points; in Italy it is three quarters that figure (0.6 points). This result reflects the large recourse to extraordinary taxes in Italy to finance the stimulus measures. In the BIQM, capital taxation (where these extraordinary taxes are classified) does not directly influence disposable income and has negligible effects on economic activity. It may be argued that this feature of the model is particularly justified in this case, given that the voluntary character of the payments made by the private agents should have strongly limited the negative impact of the tax on their consumption and investment decisions. As mentioned in Section 3, the more effective fiscal stimulus in Italy will have significant budgetary costs in 2010 and in the following years. Excluding capital taxes from net borrowing, the relative effectiveness of fiscal policies of the two countries (in terms of GDP gain for a given increase in deficit) reverses, becoming slightly larger for Germany, reflecting the already mentioned higher

<sup>29</sup> The average multiplier for Italy (*i.e.*, the weighted average of the multipliers associated to the different budget items) is less than one third, whereas in Germany it exceeds two thirds.

<sup>30</sup> Table 3 reports the effects of all discretionary fiscal measures along with those stemming only for strictly crisis-related measures for Germany; it further presents the sole impact of the car-scrappping scheme.

**Table 2**

**Impact of Public Finances on the German and Italian Macroeconomies, 2009**

	Baseline <sup>(1)</sup>		Discretionary Policy <sup>(2)</sup>	Discretionary Policy and Cycle <sup>(2)</sup>	Deviations from Benchmark (Neutral Public Budget) <sup>(2)</sup>
	2008	2009			
GERMANY					
GDP	0.7	−4.7	0.8	2.1	2.1
Private consumption	0.6	−0.1	1.6	4.2	3.5
Total fixed investment	1.8	−10.1	1.7	2.6	2.1
Exports	2.0	−14.2	−0.1	−0.5	−0.3
Imports	2.9	−9.4	1.1	2.0	1.6
GDP deflator	1.0	1.4	−0.1	−0.4	−0.6
Public expenditures net of interest payments	2.7	5.7	1.2	1.9	2.3
Public receipts net of interest receipts	2.1	−2.0	−0.6	−2.8	−4.3
Public deficit / GDP (*)	0.1	−3.0	0.8	2.1	3.3
Public deficit net of interest payments and receipts / GDP (*)	2.5	−0.7	0.8	2.1	3.2
Public expenditures net of interest payments / GDP (*)	41.1	44.9	0.2	0.1	0.4
Public receipts net of interest receipts / GDP (*)	43.5	44.2	−0.6	−2.0	−2.8
Public deficit net of interest payments and receipts / Trend GDP (*)	2.5	−0.7	0.8	2.0	3.1
ITALY					
GDP	−1.3	−5.1	0.6	1.0	1.0
Private consumption	−0.8	−1.8	0.5	1.1	1.0
Total fixed investment	−4.0	−12.2	1.3	1.4	0.7
Exports	−3.9	−19.1	0.0	0.3	0.4
Imports	−4.3	−14.6	0.9	1.4	1.2
GDP deflator	2.8	2.1	0.0	−0.6	−1.6
Public expenditures net of interest payments	3.4	4.9	1.5	1.6	2.7
Public receipts net of interest receipts	1.1	−1.9	1.0	−1.5	−4.5
Public deficit / GDP (*)	2.7	5.3	0.2	1.5	3.5
Public deficit net of interest payments and receipts / GDP (*)	−2.2	0.9	0.2	1.5	3.4
Public expenditures net of interest payments / GDP (*)	44.2	47.8	0.4	0.6	1.6
Public receipts net of interest receipts / GDP (*)	46.5	47.0	0.2	−0.9	−1.8
Public deficit net of interest payments and receipts / Trend GDP (*)	−2.2	0.9	0.2	1.4	3.3

<sup>(1)</sup> Percentage rate of change, except (\*): percentage points.

<sup>(2)</sup> Percentage difference with respect to the baseline in 2009, except (\*): percentage points difference with respect to the baseline in 2009.

Table 3

**Breakdown of the Effects of  
Discretionary Public Finance Measures on the German Macroeconomy, 2009**

	<b>All Measures (cfr. Table 4)</b>	<b>of which : Taken in Response to the Crisis</b>	<b>of which : Reflecting Environmental Premium</b>
GDP	1.0	0.8	0.2
Private consumption	1.8	1.6	0.7
Total fixed investment	1.6	1.7	0.3
Exports	-0.1	-0.1	0.0
Imports	1.2	1.1	0.7
GDP deflator	0.0	-0.1	0.0
Public expenditures net of interest payments	1.9	1.2	0.3
Public receipts net of interest receipts	-0.6	-0.6	0.2
Public deficit / GDP (*)	1.1	0.8	0.1
Public deficit net of interest payments and receipts / GDP (*)	1.1	0.8	0.1
Public expenditures net of interest payments / GDP (*)	0.5	0.2	0.0
Public receipts net of interest receipts / GDP (*)	-0.7	-0.6	0.0
Public deficit net of interest payments and receipts / Trend GDP (*)	1.1	0.8	0.1

Note: Deviations from baseline in percent, except (\*): percentage points.

fiscal multipliers in the German model.<sup>31</sup>

The estimated impact of fiscal measures on GDP includes the effects of car scrapping schemes (in both countries) and incentives to investment on machinery (in Italy only). Car scrapping schemes were introduced in February 2009 in both countries and expired in September and December, respectively. It is estimated that their contribution to GDP growth in 2009 amounted to 0.2 percentage points in both countries. Investment incentives in Italy (the so-called “Tremonti-ter”) were introduced in July 2009 and are due to expire next June. We estimate that in 2009 they boosted GDP by slightly more than 0.1 percentage points.

Preliminary estimates for 2010 (based on projections for both public finance aggregates and macroeconomic variables) suggest that the gap between the two countries in terms of support to growth from fiscal stimulus measures will widen this year: the Italian fiscal impact on economic

<sup>31</sup> This is consistent with the evidence presented in Henry, Hernández de Cos and Momigliano (2008), where, for the first year after the shock, the fiscal multiplier systematically tends to be higher for Germany than for Italy. This is not so, however, for the following year. See also Fagan and Morgan (2005).

activity will turn broadly neutral while for Germany it will be broadly the same as in 2009. In both countries, a negative impact on GDP growth is estimated to stem from the expiration of the car scrapping incentives. In Italy, this will be broadly offset by higher current expenditure (financed, as in 2009, by extraordinary taxation) and by some (positive) lagged effects of the 2009 measures. In the case of Germany, significant expenditure-increasing and revenue-reducing measures have been implemented for 2010.

While the automatic stabilizers had a broadly comparable impact on the budget balance (1.4 per cent of output for Italy and 1.6 per cent for Germany), their estimated effects on GDP are much more pronounced in Germany than in Italy (1.3 and 0.3 percentage points, respectively). This reflects partly their composition (with much higher unemployment-related payments in the case of Germany) and, to a larger extent, the higher fiscal multipliers in the German model. In both countries, however, automatic stabilizers have been relatively less effective than discretionary measures, in terms of GDP gain for a given increase in current deficit.

Overall, discretionary and automatic fiscal responses to the downturn are assessed to have contributed to reducing the impact of the crisis in 2009 by 1.0 percentage points in Italy and by 2.1 in Germany.<sup>32</sup> The difference between the two countries virtually vanishes if the extreme assumption is made that the two economies react identically to fiscal shocks and hence the same set of standard fiscal multipliers is used for both countries.<sup>33</sup>

The impact on prices of the fiscal responses to the crisis (automatic and discretionary together) has been more pronounced in Italy than in Germany, reflecting the larger fall (due to automatic stabilizers) in social contribution and VAT in the former country (see Section 3).

The deviations which occurred in 2009 of budgetary components from the neutrality assumption (as defined above) led to a 3 percentage points increase of the deficit-to-GDP ratio in both countries (last column of Table 2). In Italy, the difference can be evenly attributed to both receipts and expenditures, in Germany, mostly to receipts. The corresponding effects on GDP are, for both countries, close to the overall estimated impact of discretionary measures and automatic stabilizers (previous column of Table 2), notwithstanding the much larger change induced on the deficit.

## 5 Concluding remarks

The worldwide recession that spread in the fall of 2008 was counteracted by an extraordinarily massive and prompt response of both monetary and fiscal policy authorities everywhere.

In the European context, the recourse to discretionary fiscal stimulus measures and the intensity with which automatic stabilisers operated varied across countries, largely reflecting the different room for manoeuvre set by their different starting conditions.

Germany and Italy, the countries object of this study, responded to the crisis with a relatively ample fiscal reaction by the first and with a limited stimulus by the latter.

<sup>32</sup> It must be noted that our estimates do not include the impact of some measures taken by both governments whose effects cannot be easily assessed (e.g., measures taken to foster banks' capitalization, to extend guarantees on deposits, etc.). To put our estimates into perspective, it may be useful to refer, for the Italian case only, to the results in Caivano, Rodano and Siviero (2010). They estimate the effects on output of the reaction of monetary policy to the crisis to be approximately the same as the positive boost of fiscal policy as estimated here. Their estimate, however, does not include the impact of non-conventional monetary policies.

<sup>33</sup> We used the set of multipliers of the OECD Interlink model for the euro area presented in Dalsgaard *et al.* (2001): 1.2 for direct spending and -0.5 for taxes. We applied the multiplier for taxes also to transfers. In this analysis, for both countries, the general government reduced the fall in real GDP in 2009 by approximately 1½ percentage points.

Concerning discretionary and automatic budgetary responses, our findings – which overall suggest that differences may be less pronounced than they look – may be summarised as follows:

- 1) The discretionary stimulus measures in Germany have been markedly more deficit-expanding than in Italy. However, the cyclically-adjusted primary balances worsened by a similar amount in the two countries; in other terms, the difference in discretionary policies largely offset the divergence in underlying trends (which implied a larger worsening of the budget balance in Italy);
- 2) contrary to Germany, Italy financed its stimulus measures partly with deficit-reducing interventions characterized by a limited negative impact on the economic activity, with the aim of stimulating the economy while at the same time limiting the short-term effects on the deficit; this policy implies, however, future budgetary costs.
- 3) the automatic stabilisers are estimated to have had a comparable impact on the deficit of the two countries.

We also assessed the macroeconomic effects of stimulus measures and the overall stabilizing role of the two public sectors on the basis of counterfactual simulations with the econometric models of the two countries developed and maintained at the Deutsche Bundesbank and Banca d'Italia, respectively. Our main results are the following:

- i) discretionary stimulus measures raised GDP by 0.8 percentage points in Germany and 0.6 points in Italy. For a given impact on the deficit, the effect on Italian GDP is larger, reflecting the differences in the composition of the two stimulus packages (which more than offset the lower fiscal multipliers implicit in Banca d'Italia's model);
- ii) by contrast, automatic stabilisers are estimated to have boosted output more in Germany than in Italy;
- iii) overall, the general government reduced the fall in real GDP in 2009 by more than 2 percentage points in Germany and by 1 in Italy.

As already noted, the results of our simulations are influenced by differences in the two econometric models, which (though consistent with previous findings in the literature) may or may not fully correspond to genuine differences between the two economies. Under the extreme assumption that the two economies react identically to fiscal shocks, the differences in the combined impact of discretionary fiscal measures and automatic stabilizers in 2009 almost vanish.

## APPENDIX 1

### THE MODELS USED FOR THE COUNTERFACTUAL SIMULATIONS

**Bundesbank's BbkM:** The long-run properties of the quarterly macroeconomic model of the Bundesbank can be described as neoclassical; in the short-run, by contrast, the model features are basically Keynesian. Potential GDP is derived by a Cobb-Douglas production technology with constant returns to scale and long-run growth is driven by variations in population and productivity. Firms and households optimise their behaviour. Their expectation formation process is largely backward-looking (adaptive expectations). The short-run properties of the model are determined by price and wage rigidities. The rather slow adjustment of prices and wages to their equilibrium levels leads to persistent market disequilibria and cyclical fluctuations around the path of potential GDP.<sup>34</sup>

**Banca d'Italia's BIQM:** The new version of the BIQM shares many of the characteristics of the previous one, released in 1986 (see Banca d'Italia, 1986). Its long-term properties are consistent with a neoclassical model postulating exogenous growth, in which full employment of factors is accompanied by a constant rate of inflation, hence constant relative prices. The levels of output and of the employment of capital and labour are consistent with the parameters of the aggregate production function and with relative factor costs. The steady-state growth path of the model, stemming from technical progress and the accumulation of real and financial wealth, interacts with the dynamics of the adjustment process to determine short-term characteristics.<sup>35</sup> The adjustment processes essentially reflect three factors: the stickiness of prices and wages, which prevents their instantaneous adaptation to the situation of full resource utilisation; the non-malleability of installed physical capital, which limits the short-term modifiability of the relative composition of productive factors; and the possibility that expectations and outcomes may not coincide. In the short run, therefore, given these rigidities, the characteristics of the model fit the Keynesian framework in which the level of output is determined by the trend in aggregate demand, in a situation of oversupply in both the goods and the labour market.<sup>36</sup>

<sup>34</sup> A more comprehensive description of the model can be found in Hamburg and Tödter (2005). Since 2005 the model has been used in a version adjusted to requirements of the projection process within the ESCB. Calculations are undertaken with the model focusing on the German economy, where "external" variables (e.g., interest rates, exchange rates, international commodity prices) are exogenous.

<sup>35</sup> The coexistence of a neoclassical macroeconomic equilibrium framework with Keynesian short-to-medium-term adjustment processes is a feature shared by most existing macroeconomic models (see, e.g., Church, Sault, Sgherri and Wallis, 2000).

<sup>36</sup> For a more detailed description of the main properties of the model, see Busetti, Locarno and Monteforte (2005).

## APPENDIX 2

### THE DESIGN OF THE NEUTRAL BENCHMARK COUNTERFACTUAL SIMULATION

To simulate the effects of neutral public budget, we adopt the following definition: the activity of the public sector is deemed neutral if all the items of the general government budget in 2009 (excluding interest payments) remain at the same level of 2008, in relation to trend GDP.<sup>37</sup>

This definition of neutrality includes a small but relevant variant with respect to the definition adopted in previous studies. Specifically, instead of keeping budget items unchanged with respect to GDP, in this case we chose to keep them constant with respect to *trend* GDP. This choice is justified by the large output drop recorded in 2009 in both countries. Had we kept the ratios unchanged with respect to (headline) GDP, this would have implied slashing all budget items by a very sizeable, and implausible, amount (about 4 per cent in nominal terms). Such a dramatic cut to all budget items could hardly be deemed “neutral”. Keeping items unchanged with respect to trend GDP guarantees medium-term neutrality, avoiding excessive fluctuations in budgetary items.

A different criterion was adopted for interest payments, kept endogenous as a function of interest rates and the size of public debt.<sup>38</sup> Consequently, the counterfactual simulation reflects, via the channel of interest payments, the indirect effects stemming from the counterfactual developments in all other budget items.

It should be emphasized that the “neutral budget” simulation cannot be directly compared with the other two (*i.e.*, with the “no discretionary measures” and “no cyclical effects” simulations), as it ignores by construction any additional information on the effectiveness of specific fiscal policy measures. For instance, the macroeconomic effects of incentives for car purchases (estimated to have boosted the GDP of both countries by 0.2 points in 2009) are included in the previous two simulations, but not in the “neutral budget” one.

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<sup>37</sup> For a more detailed discussion of the motivations behind this choice, including a critical appraisal of the drawbacks that alternative definitions (e.g., keeping budget items unchanged in real terms) entail, see, e.g., Momigliano and Siviero (1997), where references to the relevant literature may also be found.

<sup>38</sup> For the treatment of interest rates in the counterfactual benchmark simulation, see Subsection 3.4.

### APPENDIX 3

#### TREATMENT OF *CETERIS PARIBUS* ASSUMPTIONS

This appendix describes the assumptions which were formulated for exchange rates, interest rates and the mechanisms involved in the formation of expectations in all counterfactual simulations.

As regards interest rates, the choice was made to keep the nominal short-term interest rates unchanged with respect to history. Let us remark, in this respect, that our counterfactual simulations, while resulting in a further worsening of the economic activity, do not radically change the picture: the order of magnitude of the recession, though sensibly reduced, remains very large in a historical perspective. It is thus reasonable to assume that monetary policy would not have been much different for our fiscal policy simulations. Let us also emphasize that margins for further expansionary monetary policy with traditional tools were limited, given the low levels reached by policy interest rates.<sup>39</sup> Long-term rates were also kept unchanged.

As regards the (nominal) exchange rate, the technically simple hypothesis of unchanged historical values was adopted; this choice is justified by the same line of reasoning as above.

Instead of the foregoing hypotheses it would have been possible, in theory, to try and take account of the effects of the public finances on the risk premia associated with the issuer and expectations concerning inflation and the exchange rate. Overall, we feel that our choices minimize the margin of discretion and are less arbitrary than alternatives, given the well-known difficulties of finding sensible and empirically robust explanations of risk premia dynamics.

As regards the treatment of economic agents' expectations, the latter are by and large assumed to be of the adaptive type in both models, with the exception of inflation expectations in the BIQM, which are generated by an equation modeling expectations data taken from the Isco-Mondo Economico survey.

It should be noted, however, that some phenomena that may have played an important role in determining the macroeconomic effects of fiscal policy in the case at hand cannot be taken into account. This is the case, for instance, of the public guarantees which were announced, at the peak of the financial crisis, to reassure economic agents (in particular depositors) and hence avoid a meltdown of the financial system.

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<sup>39</sup> A possible alternative, though not straightforward, would have been adopting a Taylor rule. At any rate, the changes in inflation and the output gap which result from our counterfactual simulations are overall quite limited and moreover tend to offset one another.



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# **FISCAL POLICY IN THE UNITED STATES: AUTOMATIC STABILIZERS, DISCRETIONARY FISCAL POLICY ACTIONS, AND THE ECONOMY**

*Glenn Follette\* and Byron Lutz\**

*We examine the effects of the economy on the government budget as well as the effects of the budget on the economy. First, we provide measures of the effects of automatic stabilizers on budget outcomes at the federal and state and local levels. For the federal government, the deficit increases about 0.35 per cent of GDP for each 1 percentage point deviation of actual GDP relative to potential GDP. For state and local governments, the deficit increases by about 0.1 per cent of GDP. We then examine the response of the economy to the automatic stabilizers using the FRB/US model by comparing the response to aggregate demand shocks under two scenarios: with the automatic stabilizers in place and without the automatic stabilizers. Second, we provide measures of discretionary fiscal policy actions at the federal and state and local levels. We find that federal policy actions are somewhat counter-cyclical while state and local policy actions have been somewhat pro-cyclical. Finally, we evaluate the impact of the budget, from both automatic stabilizers and discretionary actions, on economic activity in 2008 and 2009.*

## **1 Introduction**

Fiscal policy has been a key policy tool in addressing the aggregate demand consequences of the financial crisis in the United States. This paper examines fiscal policy at both the federal and state and local level and looks at the effects of both automatic stabilizers and discretionary fiscal actions. Our analysis involves three steps. First, we provide measures of the effects of the automatic stabilizers on budget outcomes at the federal and state and local levels. For the federal government, the deficit increases about 0.35 per cent of GDP for each 1 percentage point deviation of actual GDP relative to potential GDP. For state and local governments, the deficit increases by about 0.1 per cent of GDP. We then examine the response of the economy to these automatic stabilizers using the FRB/US model by comparing the response to aggregate demand shocks under two scenarios: with the automatic stabilizers in place and without the automatic stabilizers. Second, we provide measures of discretionary fiscal policy actions at the federal and state and local levels. We find that federal policy actions are somewhat counter-cyclical: expenditures and tax actions are typically more stimulative after a business cycle peak than before the peak. In contrast, we find that state and local policy actions have been somewhat pro-cyclical, probably reflecting constitutional restrictions on general fund budget balances. We also consider the multiplier impacts of these actions. Third, armed with the information from our two estimation steps, we evaluate the impact of the budget, from both automatic stabilizers and discretionary actions, on economic activity over the past two years.

## **2 Automatic stabilizers**

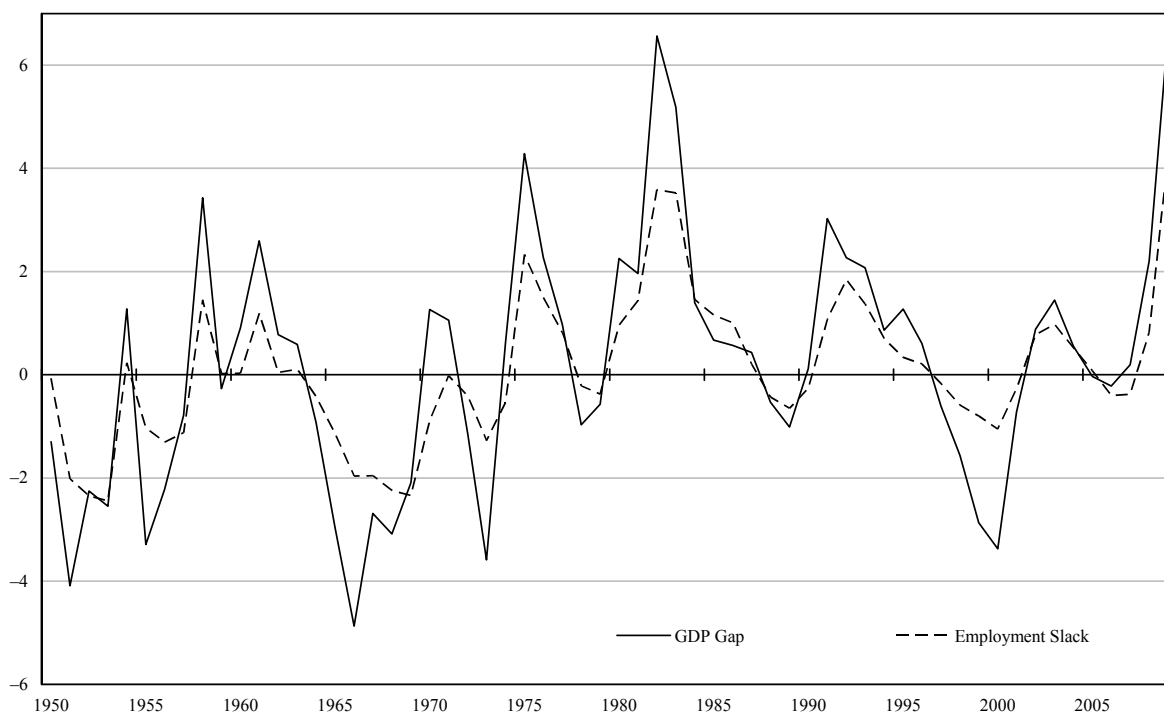
To assess the effect of the business cycle on government budgets, we use a high-employment budget framework that allows us to separate National Income and Product Accounts (NIPA) revenues and expenditures into their cyclical and non-cyclical components; our measures are based on the methodology developed for the federal budget by Frank de Leeuw *et al.* (1980), refined by

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\* Federal Reserve Board.

Figure 1

**Estimates of GDP Gap and Employment Slack**  
(calendar years, percent)



Note:  $GDPGAP = (Potential\ GDP - GDP) / Potential\ GDP * 100$ . Employment slack is unemployment rate minus NAIRU.

Cohen and Follette (2000), and subsequently applied to the state and local sector by Knight, Kusko and Rubin (2003), and Follette, Kusko and Lutz (2008). The high-employment budget methodology allows us to strip out the effects of cyclical macroeconomic developments on actual budget outcomes and thus provides an indication of the path the budget would have followed had the economy continually operated at its potential level. By design, it is unaffected by the actions governments take to offset the automatic changes in revenue or expenditures, such as tax rate increases in response to falling receipts.

To construct our high-employment budget, we use the NIPA budget data at the federal and state and local levels and the Congressional Budget Office's (CBO's) estimates of potential GDP. Figure 1 shows the estimates of the GDP gap and the difference between the actual unemployment rate and the NAIRU (which we term "employment slack"). Then we follow the procedure detailed in Cohen and Follette (2000) to adjust receipts and current expenditures to the levels they would attain if the economy were operating at its potential level.

The cyclical adjustment to receipts, which accounts for the bulk of the total cyclical adjustment, depends upon three factors: the composition of receipts, the estimated cyclicity of the base for each major tax, and the elasticity of the tax to the base.<sup>1</sup> For summary statistics we will

<sup>1</sup> The tax bases for the major taxes are NIPA taxable personal income for personal taxes, NIPA corporate profits for corporate taxes, aggregate wages and salaries for social insurance contributions, NIPA personal consumption expenditures on goods for sales taxes. NIPA taxable personal income is defined as NIPA personal income less transfers plus employee contributions for social insurance. We adjust NIPA corporate profits to remove the *earnings* of the Federal Reserve System, which are included in the NIPA measure.

report two measures, the elasticity of the overall tax system with respect to cyclical GDP,  $\varepsilon_{\frac{T}{GDP}}$  (Table 2), and the change in taxes associated with a 1 percent change in the cyclical GDP (Table 5). The overall elasticity of the tax system is:

$$\varepsilon_{\frac{T}{GDP}} = \sum \varepsilon_{B_i} * \varepsilon_{\tau_i} * \frac{T_i}{T} = \sum \varepsilon_{\frac{i}{GDP}} * \frac{T_i}{T} \quad (1)$$

where  $T$  is total tax collections,  $T_i$  is the collection from tax  $i$ ,  $B_i$  is the tax base of tax  $i$ ,  $\varepsilon_{B_i}$  is the elasticity of  $B_i$  with respect to cyclical changes in GDP,  $\varepsilon_{\tau_i}$  is the elasticity of tax  $i$  with respect to  $B_i$  and  $\varepsilon_{\frac{i}{GDP}}$  is the elasticity of tax  $i$  with respect to cyclical GDP. Although we estimate time varying elasticities, the time subscripts are suppressed here for notational simplicity. The second summary measure, the change in revenues as a percent of GDP, simply equals the product of the overall elasticity,  $\varepsilon_{\frac{T}{GDP}}$ , and the tax share of GDP. Accordingly, we require estimates of the elasticity of tax bases to cyclical changes in GDP,  $\varepsilon_{B_i}$ , and elasticities of the taxes to the tax bases,  $\varepsilon_{\tau_i}$ . The first is accomplished through regressions of components of the tax base with respect to the GDP gap. The tax elasticities,  $\varepsilon_{\tau_i}$ , are built up from detailed information about the tax code and its changes over time and a variety of auxiliary regressions.<sup>2</sup>

### 2.1 Elasticity of the tax bases

Our estimates of the elasticity of the tax bases,  $\varepsilon_{B_i}$ , are implemented through several steps and are based on a few assumptions. First, we assume that each component of the tax base is potentially differentially affected by cyclical changes in GDP. Second, we assume that the bases are buffeted by other factors than cyclical changes in GDP, and therefore we do not use detrending methods, such as an HP filter, to separate trend from cycle because these other factors would be conflated with the cyclical changes. Third, we assume that the cyclical affects may appear with some lag. Equation (2) captures these assumptions and equation (3) is the resulting high-employment tax base.

$$SHAREK_{i,t} = SHARE_{i,t} - \sum_{v=0}^{v=lag_i} \beta_{i,v} * (GDPGAP_{t-v}) \quad (2)$$

$$BASEK_{i,t} = SHAREK_{i,t} * GDPK_t \quad (3)$$

For each variable, the  $K$  denotes the high-employment variable (potential GDP is therefore denoted as  $GDPK_t$ ),  $SHARE_i$  is the ratio of the base for tax  $i$  to GDP,  $GDPGAP$  is the difference between potential GDP and actual GDP divided by potential,  $BASE_i$  is the relevant tax base for tax  $i$ , and  $lag_i$  quantifies the lag structure for tax  $i$ .

We operationalize equation (2) by estimating the first difference of equation 2:

<sup>2</sup> We do not attempt to estimate the tax elasticities from the aggregate time series data because movements in taxes in these data also include frequent and sometimes substantial changes in policy.

Table 1

## Share Equations

Item	$GDP\ gap_t$	$GDP\ gap_{t-1}$	$GDP\ gap_{t-2}$	$GDP\ gap_{t-3}$	$GDP\ gap_{t-4}$	$\Sigma(GDP\ gap)$
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta$ Wages	0.189	-0.121	-0.040	-0.073	0.000	-0.044
$t$ -value	10.072	-6.185	-2.022	-3.736	0.020	n.a.
$\Delta$ Supplements (inc. employer's)	0.033	-0.004	0.002	-0.012	0.005	0.024
$t$ -value	5.050	-0.621	0.248	-1.743	0.832	n.a.
$\Delta$ Profits	-0.286	0.028	0.069	-0.013	0.107	-0.095
$t$ -value	-11.536	1.094	2.678	-0.491	4.278	n.a.
$\Delta$ Proprietor's income	0.011	-0.003	-0.023	0.001	0.007	-0.007
$t$ -value	0.654	-0.164	-1.344	0.033	0.423	n.a.
$\Delta$ Rental income	0.021	-0.001	0.008	0.003	-0.005	0.025
$t$ -value	4.019	-0.186	1.441	0.644	-1.016	n.a.
$\Delta$ Net interest	0.034	0.004	-0.014	-0.017	0.005	0.012
$t$ -value	3.112	-0.186	-1.269	-1.508	0.506	n.a.
$\Delta$ Rent & net interest	0.054	0.003	-0.007	-0.013	0.000	0.038
$t$ -value	4.536	0.261	-0.529	-1.087	0.021	n.a.
$\Delta$ HEB property	-0.005	-0.002	-0.002	-0.003	0.000	-0.010
$t$ -value	-3.209	-1.030	-1.006	-1.669	0.112	n.a.
$\Delta$ Property	0.466	-0.155	-0.152	-0.245	0.020	-0.065
$t$ -value	3.202	-1.020	-1.007	-1.615	0.137	n.a.
$\Delta$ Personal consumption, goods	0.066	-0.016	-0.030	0.102	-0.036	0.087
$t$ -value	2.420	-0.550	-1.052	3.568	-1.306	n.a.

Note: Dependent variable is the income variable as a share of GDP and then differenced.

GDP Gap = (Potential GDP – GDP) / Potential GDP \* 100.

$$\Delta SHARE_{i,t} = \sum_{v=0}^{v=lag_i} \beta_{i,v} i * (\Delta GDP GAP_{t-v}) + u_{i,t} \quad (4)$$

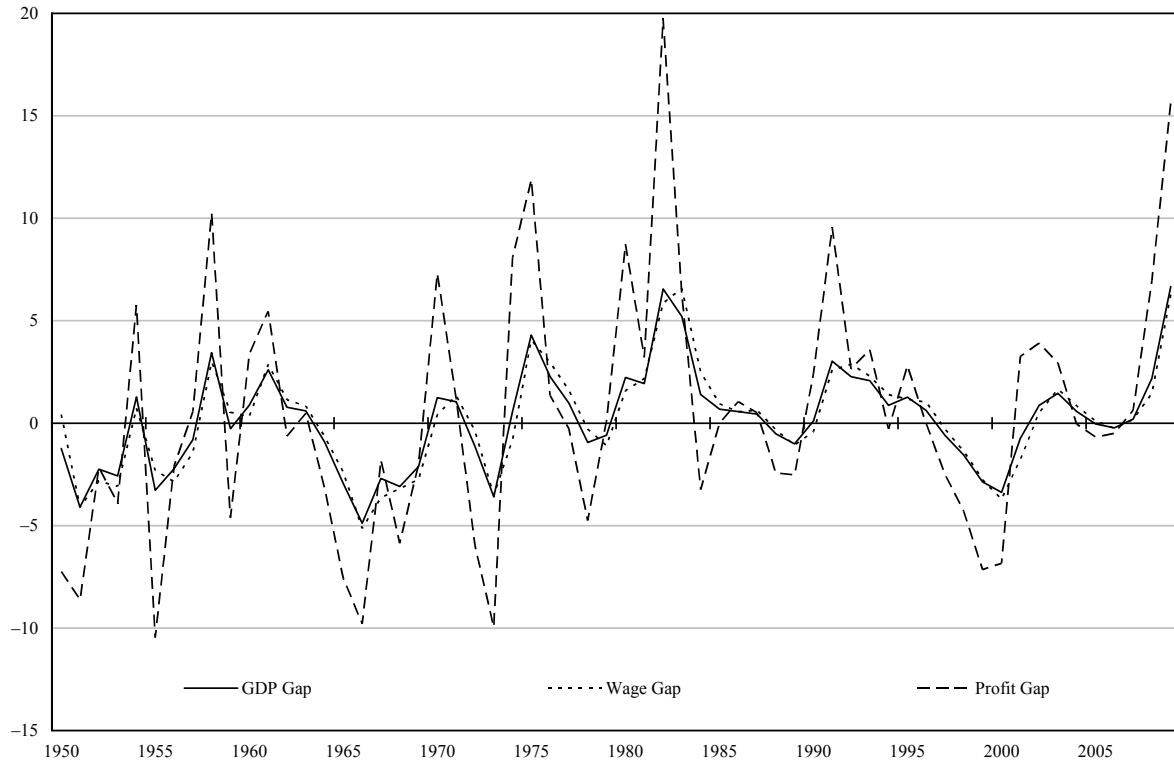
and then using the  $\hat{\beta}_i$ s to calculate the  $SHAREK_{i,t}$  values. We use quarterly data from 1950 through 2008 to estimate the  $i$  relationships and the regression results are found in Table 1.<sup>3</sup> As expected, the profit share initially falls as the economy moves into recession while the wage share rises (see column 1). Figure 2 provides a graphical representation for wages and profits by plotting the “profits gap” (cyclical profits divided by potential profits) and the “wage gap” against the GDP gap. As is clearly visible, wages are nearly perfectly unit elastic, whereas profits have an elasticity significantly in excess of 1. Finally, in order to display summary statistics for  $\mathcal{E}_{B_i}$ , we calculate the mean elasticity for each of the major tax bases by regressing the wage, personal income, and profits gaps on the GDP gap and its lags. These elasticities are presented in column 2 of Table 2.

<sup>3</sup> Note, we do not require that the deviations in the shares sum to zero. The deviations in GDI and GDP have a cyclical pattern. Thus, the income gaps do not have to sum to the GDP gap.



Figure 2

**Estimates of GDP, Wage and Profit Gaps**  
(calendar years, percent of potential GDP)



Note: A positive GDP gap implies actual GDP is less than potential GDP.

## 2.2 Federal government tax elasticities

We now turn to our procedures for estimating the elasticity of taxes to the base,  $\varepsilon_{\tau_i}$ , for the federal side. These procedures are based on the methodology in Cohen and Follette (2000). Federal personal income taxes are roughly 45 per cent of federal NIPA-based total tax receipts. Our personal income tax elasticity measure,  $\varepsilon_{\tau_p}$ , reflects two factors: the elasticity of taxes with respect to the administrative definition of income (called adjusted gross income or AGI) and the elasticity of AGI with respect to the national accounts measure of income. Furthermore, the elasticity of income taxes with respect to aggregate AGI is a weighted sum of the number of returns and average income per return where the weights are the relative contributions of changes in returns and average income to the cyclical change in income. More formally:

$$\varepsilon_{\tau_p} = \varepsilon_{tagi} \varepsilon_{pinc} = [\alpha * \varepsilon_{preturns} + (1 - \alpha) * \varepsilon_{ptax}] \varepsilon_{pinc} \quad (5)$$

where  $\varepsilon_{tagi}$  is the elasticity of taxes with respect to AGI,  $\varepsilon_{pinc}$  is the elasticity of AGI with respect to NIPA adjusted personal income,  $\varepsilon_{preturns}$  is the elasticity of taxes with respect to changes in the

number of returns, and  $\mathcal{E}_{ptax}$  which is the elasticity of the income tax schedule with respect to AGI per return. Finally,  $\alpha$  measures the relative importance of the numbers of returns and income per return in cyclical income.

As detailed in Cohen and Follette (2000) we calculate  $\mathcal{E}_{\tau_p}$  by taking a weighted average of separate calculations for single and non-single filers. We assume that  $\mathcal{E}_{preturns}$  equals 1 and construct the weight  $\alpha$  for single and non-single returns separately by regressing the number of returns filed and AGI per return to obtain estimates of their relative cyclical sensitivities. We find that for non-singles  $\alpha$  is zero as filing is not cyclically sensitive, but for single filers  $\alpha$  is about 0.5. We estimate  $\mathcal{E}_{ptax}$  for each year based on that year's tax schedule and actual distribution of income. Turning to  $\mathcal{E}_{pinc}$ , personal income as defined by the tax authorities, AGI, is more cyclical than personal income in the national accounts (NIPA), perhaps because capital gains realizations (which are not included in national accounts' definition of income) appear to be cyclical. We estimate  $\mathcal{E}_{pinc}$  by regressing average AGI per return on NIPA income per employee, with allowance for a change in the elasticity after the 1986 Tax Reform Act, and find that the current elasticity is about 1.5, compared to 1.1 before. The resulting estimates for  $\mathcal{E}_{\tau_p}$  are shown in Table 2 (columns 3 and 5) (these are mean elasticities, with the mean taken over time).

The next largest source of revenues for the federal government is social insurance contributions. These are somewhat inelastic because, while the tax rate is constant the wage base is capped, and because some sources of social insurance contributions are not based on wages. The cap, as a fraction of average wages, has fluctuated over time with changes in law and the distribution of wages. We estimate the elasticity of social insurance contributions,  $\mathcal{E}_{\tau_{si}}$  using a similar methodology used to produce  $\mathcal{E}_{\tau_p}$ . The resulting estimates are shown in Table 2 (columns 3 and 5), with the elasticity rising from about 0.3 in 1965-85 to 0.7 in 1986-2008 largely as a result of the wage caps being raised.

The corporate tax system itself is essentially unit elastic as the rate structure is very flat. As a result,  $\mathcal{E}_{ctax}$  is equal to approximately 1.04 and we assume  $\alpha$  equals zero. The cyclical movements in corporate income subject to tax are smaller than those of economic profits because some adjustments such as loss carry backs are counter-cyclical. We estimate that the elasticity of corporate income subject to tax with respect to economic profits,  $\mathcal{E}_{cinc}$ , is about 0.8. The overall elasticity of corporate taxes to economic profits,  $\mathcal{E}_{\tau_c}$ , is therefore about 0.8.

Other taxes – chiefly excise taxes and customs duties – are a small and declining share of receipts at the federal level. We set the elasticity of customs duties at 2.0, the cyclical elasticity of imports found in the FRB/US model and the elasticity of excise taxes is built up from demand elasticities of the various components – many of which, such as tobacco and alcohol – are rather inelastic. As shown in Table 2 the resulting elasticity for these other taxes is around 1.

### 2.3 Federal government total tax elasticity and cyclical revenues

Combining the estimates in columns (2) and (3)/(5) of Table 2 allows us to display the elasticity of the tax receipts with respect to cyclical GDP,  $\mathcal{E}_{\frac{i}{GDP}}$ , for the major taxes (see columns 4

Table 2

## Tax Elasticities

Item	Share of Taxes, 2007	Elasticity of Base	Tax Elasticity			
			1960-1985		1986-2008	
			NIPA Base	GDP	NIPA Base	GDP
	(1)	(2) $E_B$	(3) $E_\tau$	(4) $E_{i/GDP}$	(5) $E_\tau$	(6) $E_{i/GDP}$
<b>Federal</b>						
Total ( $E_{T/GDP}$ )		n.a.	n.a.	1.2	n.a.	1.6
Personal	45%	1.0	1.4	1.4	2.0	2.0
Social insurance	37%	1.0	0.3	0.3	0.7	0.7
Corporate	14%	4.0	0.7	2.7	0.8	3.7
Other taxes	4%	1.0	0.9	0.9	1.0	1.0
<b>State and Local</b>						
Total ( $E_{T/GDP}$ )		n.a.	n.a.	0.6	n.a.	0.6
Own revenues	100%	n.a.	n.a.	0.7	n.a.	0.8
Personal	24%	1.0	1.1	1.1	1.5	1.5
Corporate	4%	4.0	0.7	2.8	0.8	3.6
Other taxes	72%	1.0	0.5	0.5	0.5	0.5

Note: Estimated elasticities vary from year to year. The table reports multi-year averages.

and 6).<sup>4</sup> Focusing on the 1986-2008 period (column 6), corporate receipts are by far the most elastic, largely because profits are very elastic (e.g.,  $\varepsilon_{B_c}$  is large). Equation (1) allows us to pull these estimates together to produce the Federal total tax elasticity,  $\varepsilon_{T Fed} / GDP$ . For the earlier period the

total elasticity is 1.2 and for the later period it is 1.6. Total federal receipts are thus currently quite elastic with respect to the business cycle. The elasticity has increased over time as a result of both the increase in wages subject to social insurance taxes and the 1986 tax reform's effect on personal and corporate receipts.

In addition to the revenue elasticities, we also produce analogous estimates of cyclical revenues:  $TAX_{i,t} - TAXK_{i,t}$  (see Table 3 and Figure 3A). These are calculated as:

$$TAXK_{i,t} = TAX_{i,t} + TAX_{i,t} * ((BASEK_{i,t} / BASE_{i,t}) - 1) * \varepsilon_{\tau_{i,t}} \quad (6)$$

where  $TAX_i$  is tax revenue from tax  $i$ ,  $TAXK_j$  is the high-employment, or non-cyclical, portion of tax revenue and  $BASEK_j$  comes from equation (3). Note that the cyclical revenues are produced using the time-varying estimates of  $\varepsilon_{\tau_{i,t}}$  and  $BASEK_{i,t}$ .

<sup>4</sup> We estimate the multiyear elasticities by regressing the log differences of cyclical taxes on the log differences of the cyclical bases (or GDP) which provides the average response over the period with the observed dynamics of the cycle.

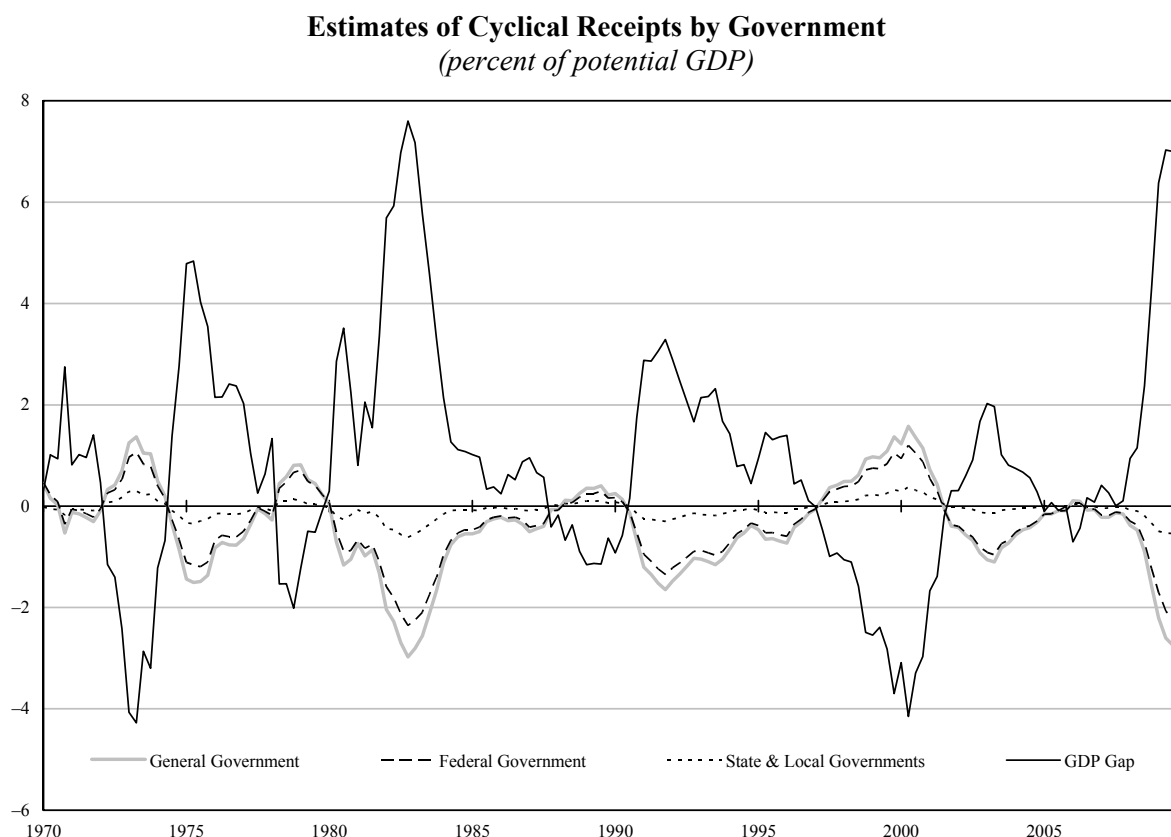
Table 3

**Cyclical Receipts**  
(percent of potential GDP)

Year	Federal	State and Local	General Government	GDP Gap
	(1)	(2)	(3)	(4)
1970	0.10	-0.08	0.02	1.27
1971	-0.13	-0.07	-0.20	1.05
1972	0.27	0.08	0.35	-1.14
1973	0.91	0.26	1.17	-3.59
1974	-0.12	-0.04	-0.15	0.63
1975	-1.14	-0.31	-1.45	4.28
1976	-0.61	-0.15	-0.77	2.27
1977	-0.22	-0.07	-0.29	0.97
1978	0.34	0.07	0.40	-0.97
1979	0.45	0.04	0.50	-0.57
1980	-0.56	-0.17	-0.73	2.25
1981	-0.84	-0.14	-0.98	1.96
1982	-1.98	-0.52	-2.50	6.57
1983	-1.87	-0.41	-2.28	5.18
1984	-0.65	-0.10	-0.75	1.39
1985	-0.34	-0.06	-0.40	0.67
1986	-0.23	-0.05	-0.28	0.57
1987	-0.31	-0.05	-0.35	0.44
1988	0.06	0.05	0.11	-0.53
1989	0.24	0.09	0.33	-1.01
1990	-0.11	-0.01	-0.11	0.12
1991	-1.16	-0.27	-1.43	3.03
1992	-1.06	-0.20	-1.26	2.27
1993	-0.92	-0.17	-1.09	2.07
1994	-0.51	-0.08	-0.59	0.87
1995	-0.50	-0.11	-0.61	1.27
1996	-0.33	-0.07	-0.40	0.61
1997	0.17	0.05	0.22	-0.61
1998	0.50	0.14	0.63	-1.56
1999	0.84	0.25	1.10	-2.87
2000	1.01	0.31	1.33	-3.37
2001	0.09	0.08	0.17	-0.73
2002	-0.59	-0.06	-0.65	0.88
2003	-0.82	-0.11	-0.93	1.45
2004	-0.40	-0.04	-0.44	0.56
2005	-0.12	0.00	-0.12	-0.03
2006	-0.00	0.01	0.01	-0.22
2007	-0.15	-0.03	-0.18	0.19
2008	-0.66	-0.18	-0.83	2.21
2009	-2.06	-0.51	-2.57	6.66

Note: GDP Gap = (Potential GDP – GDP) / Potential GDP \*100.

Figure 3A



Note: A positive GDP gap implies actual GDP is less than potential GDP.

#### 2.4 State and local government elasticities and receipts

State and local governments have a less elastic tax system than the federal government general because they rely more heavily on property taxes and sales taxes which are less cyclically sensitive and their income tax structures are less elastic. For personal income taxes, we use the same methodology as at the federal level. However, instead of estimating the effective elasticity of the tax schedule to IRS-based income,  $\epsilon_{ptax}$ , for all of the states, we assume that it is 1.1. As state income tax systems generally use the same income concept as the federal government, we use the same estimates made for the federal government for the sensitivity of IRS income to changes in NIPA personal income,  $\epsilon_{pinc}$ . Accordingly, we arrive at an overall elasticity of state and local personal income taxes with respect to cyclical personal income,  $\epsilon_{\tau_p}$ , of 1.1 before 1986 tax reform, rising to 1.5 afterwards. For corporate income taxes we use the federal measure of the elasticity of corporate income taxes to NIPA corporate profits of 0.8. For other taxes, primarily sales and property taxes, we estimate that the cyclical elasticity is 0.5 as sales taxes are unit elastic and property taxes are inelastic.

In addition to its “own” revenue, state and local governments receive a substantial amount of federal grants, equal to about 20 per cent of their total revenues which are a somewhat countercyclical revenue source. We cyclically adjust Medicaid and AFDC grants using the

procedure described below for Medicaid expenditures. For other grants from the federal government, there is no cyclical sensitivity because their levels are set through discretionary appropriations.

We estimate that the elasticity of total receipts to cyclical GDP,  $\epsilon_{TS \& \frac{L}{GDP}}$ , has moved in the range of  $\frac{1}{2}$  to  $\frac{3}{4}$  and have averaged 0.6 over the 1986 to 2008 period (see column 6 of Table 2). The elasticity is well below 1 because property taxes and most federal grants have no or little cyclical response. The damping effect of grants is substantial as the elasticity of own receipts is currently about 0.8. The variation over time reflects the changing composition of receipts. Table 3 and Figure 3A show our resulting estimates for the cyclical component of state and local revenues.

## 2.5 Federal expenditures

Among expenditures, only those transfers and grants that are oriented toward income support respond automatically to changes in economic activity. Fluctuations in unemployment benefits account for the vast majority of the cyclical swing in expenditures; also contributing to the swings are changes in the number of beneficiaries of low-income and disability programs such as food stamps, earned income credit, welfare (prior to the 1996 reform), and disability insurance. We use both aggregate macro data and micro studies to create estimates for the cyclical sensitivity of expenditures.

Unemployment benefits are typically available for up to 26 weeks. Since 1970 the time period is automatically extended in states with high unemployment. However, the automatic trigger appears to be set at “too high” a level and temporary programs have been enacted during every recession. Our estimates of the cyclical component of the budget exclude expenditures by the temporary programs because they are not automatic. Based on these observations we estimate:

$$\Delta \frac{UIBEN_t}{WS_t} = \alpha + \beta_c \Delta RU_t + \beta_{-1} \Delta RU_{t-1} + \beta_{-2} \Delta RU_{t-2} + \epsilon_t \quad (7)$$

where UIBEN is regular unemployment benefits excluding the temporary benefit expansions, WS is NIPA wages and salaries and RU is the total civilian unemployment rate (RU).

These regression results indicate that a 1 percentage point increase in the unemployment rate would boost benefits by 0.25 per cent of wages and salaries over the first two quarters, or 0.10 per cent of potential GDP, dropping back a bit in the third quarter as benefit eligibility is exhausted (see Table 4).

Other changes in expenditures are smaller individually, but sum to about the same total as unemployment benefits.

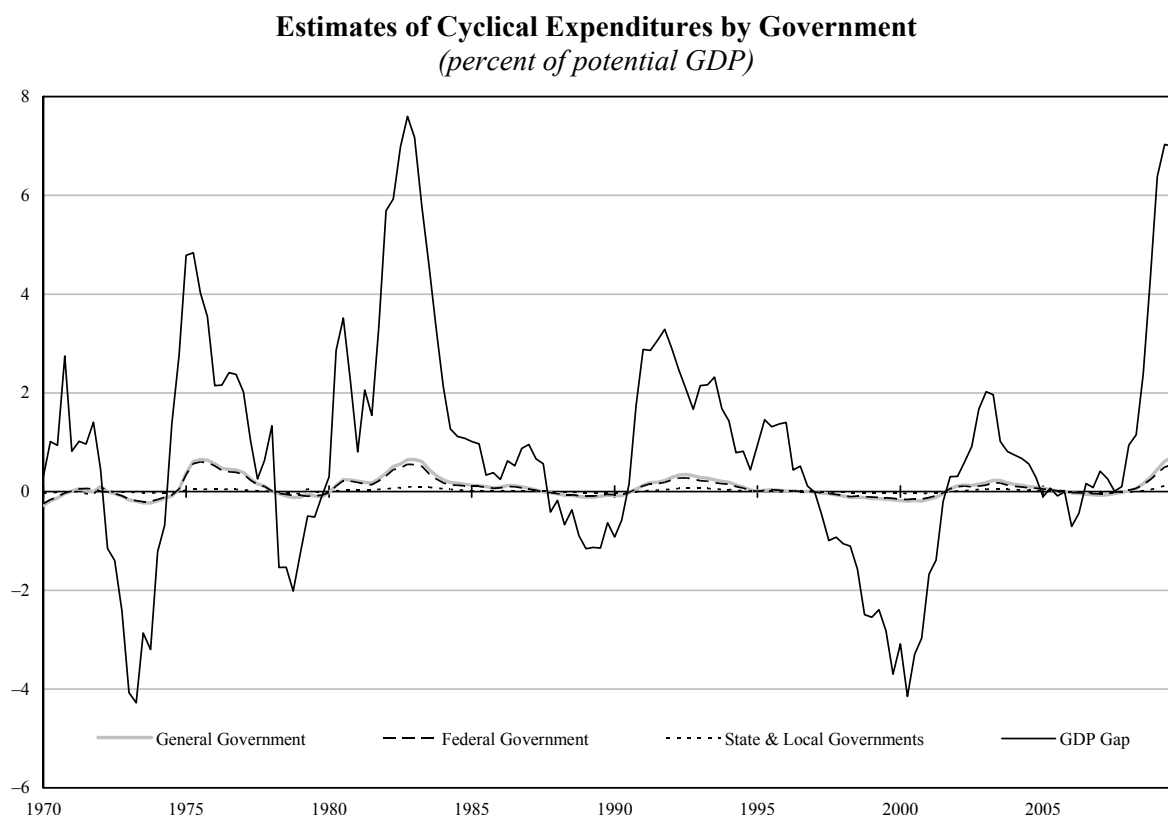
**Table 4**

### Cyclical Sensitivity of Unemployment and Food Stamp Benefits

Dependent variable	Independent variables		
	<i>RU</i>	<i>RU(T-1)</i>	<i>RU(T-2)</i>
	(1)	(2)	(3)
UI benefits / Wages*100	0.20	0.06	-0.02
<i>t</i> -value	(10.40)	(2.60)	(1.20)
Food Stamps / GDP*100	0.037		
<i>t</i> -value	(4.73)		

Note: Data are in first differences.

Figure 3B



Note: A positive GDP gap implies actual GDP is less than potential GDP.

The food stamp program is the next largest program. Time series regressions on the aggregate caseload data, similar to equation (7), indicate that a percentage point increase in the unemployment rate boosts food stamp expenditures by about 0.04 per cent of GDP. For welfare and Medicaid we draw upon Blank (2001) and model the cyclical portion of these programs as a function of past changes in the unemployment rate and infer that Medicaid grants rise by 0.02 per cent of GDP per percentage change in the unemployment rate. In 1996 federal welfare payments were changed to block grants and are no longer sensitive to economic conditions, previously it would have raised these expenditures by 0.015 per cent of GDP. Finally, studies using micro data have concluded that both the old age (OASI) and disability (DI) programs are cyclically sensitive – see Kalman, Rupp and Stapleton (2005) and Autor and Duggan (2006) – but that the movements are economically negligible in size.

Adding up all of the above programs, for every percentage point increase in the unemployment rate cyclical expenditures rise about 0.15 per cent of GDP. Using an Okun's law relation of a 0.4 percentage point change in the unemployment rate for each 1 percentage point change in real GDP implies a 0.06 percentage point increase in federal expenditures for each percent change in real GDP (Table 5 and Figure 3B).

## 2.6 State and local expenditures

State and local government expenditures are equal to about 15 per cent of GDP, but only

about 3 per cent of GDP are in the cyclically sensitive transfers category. For Medicaid expenditures and welfare caseloads we again draw upon Blank (2001) to estimate the cyclical sensitivity. For other transfers, we use the time series NIPA data and regressions similar to equation (7) to estimate cyclical sensitivities, but the estimated elasticities are small. All in all, the overall sensitivity of gross state and local expenditures is quite small and lags the business cycle by about a year and reaches only about 0.04 per cent of GDP per percentage point change in the unemployment rate. With much of that accompanied automatically by federal grants, the change in expenditures less grants is only 0.02 per cent of GDP per 1 percentage point change in the unemployment rate and 0.01 per cent of GDP per one percent change in cyclical GDP.

## 2.7 *Cyclical deficits*

Table 5A brings these pieces of the analysis together to provide estimates of the cyclical budget sensitivities at the federal, state and local and general government levels. Specifically, we evaluate our revenue and expenditure elasticities using the current values of revenues and expenditures as a percent of GDP. (For instance, the Federal total tax elasticity with respect to cyclical GDP on Table 2 is 1.6 and Federal revenues comprise about 19 per cent of GDP. Thus, the change in Federal revenues as a percent of GDP produced by a 1 percent change in cyclical GDP is 0.30 – see column 1.) We then subtract the expenditure estimates from the revenue estimates to produce an estimate of cyclical deficits, or net lending (column 3). State and local cyclical deficits are much smaller than Federal deficits, likely reflecting balanced budget requirements at the state and local level.

At the general government level (column 3), the deficit is increased about 0.5 per cent of GDP for every 1 percent decline in GDP.<sup>5</sup> In the current environment, the deficit is about 3.3 per cent of GDP, or \$500 billion, larger than it would be if the economy had been at full employment (Table 5B, column 2, and Figure 3C). Total general government net lending was around \$1,600 billion in 2009 (Table 5B, column 1), or 11 per cent of actual GDP, thus about 30 per cent of the 2009 deficit was generated by the automatic stabilizers.

## 2.8 *Effect of automatic stabilizers on the economy*

We use simulations of the FRB/US model to examine the degree to which the automatic fiscal stabilizers considered above help or hinder the performance of the broader economy.<sup>6</sup> We simulate the impact of a negative demand shock under two scenarios. In the first simulation the automatic stabilizers are left on and the economy is subjected to a series of negative aggregate demand shocks that by construction lower the level of GDP by 1 percent lower for eight quarters. The federal funds rate is maintained at its baseline value. In the second simulation we turn off the federal automatic stabilizers by using a counterfactual tax structure in which taxes are independent of income and transfers are independent of the unemployment rate and we subject the economy to the same demand shocks used in the first simulation. A comparison of GDP growth in the first and second simulations provides an estimate of the extent to which the stabilizers mute negative demand shocks.

As constructed, in the first simulation, real GDP falls 1 percent for eight quarters. In the second simulation real GDP falls 1.1 per cent after four quarters and 1.2 per cent after eight

<sup>5</sup> This is a considerably larger response than estimated by Van den Noord (2000), largely reflecting different assessments of the elasticity of taxable personal income to cyclical GDP.

<sup>6</sup> FRB/US is a large-scale quarterly econometric model of the U.S. economy developed by the staff of the Federal Reserve. See Brayton and Tinsley (1996) for a detailed introduction to the model.



**Table 5A****Cyclical Response of Budget**

<b>Item</b>	<b>Own Revenues</b>	<b>Expenditures less Grants Received</b>	<b>Net Lending</b>
	(1)	(2)	(3)
<i>(percent of GDP, per one percent change in cyclical GDP)</i>			
General government	−0.37	0.09	−0.46
Federal government	−0.31	0.08	−0.39
State and local governments	−0.06	0.01	−0.07
<i>(percent of potential GDP using CBO's estimate of potential GDP in 2009)</i>			
General government	−2.63	0.47	−3.11
Federal government	−2.09	0.41	−2.50
State and local governments	−0.54	0.07	−0.61
<i>(billions of dollars using CBO's estimate of potential GDP in 2009)</i>			
General government	−402	72	−474
Federal government	−320	62	−381
State and local governments	−82	10	−93

Note: The CBO estimated potential GDP in 2009 to be 15,275 billion dollars and the GDP gap to be 6.75 per cent.

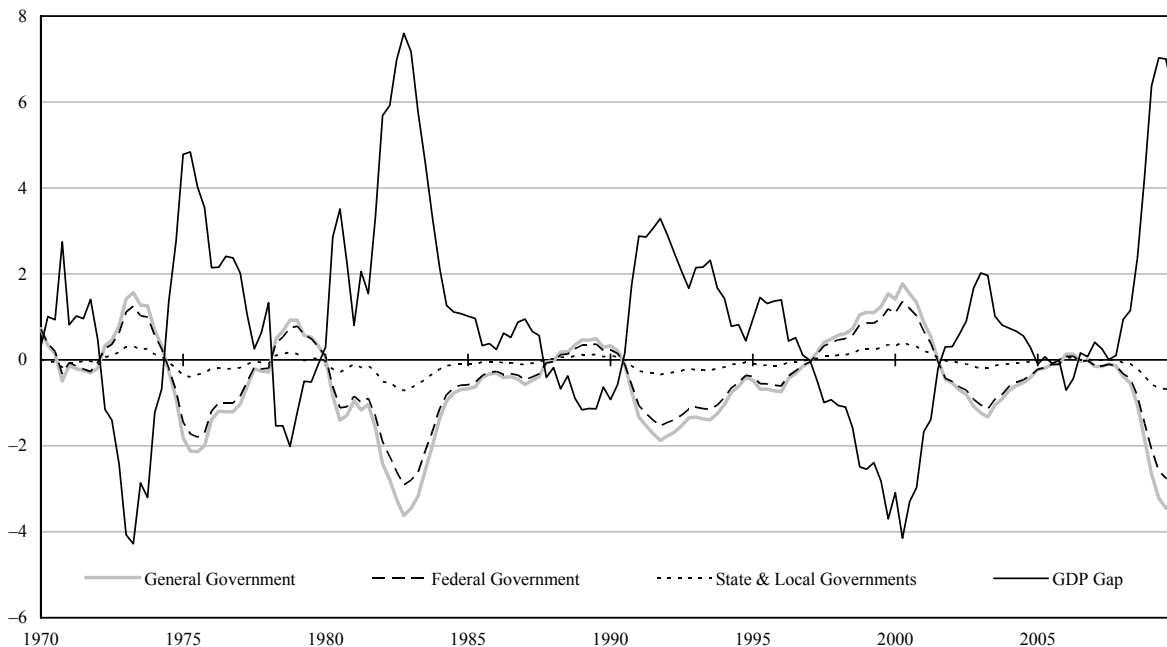
**Table 5B****Cyclical Response of Budget**

<b>Item</b>	<b>Actual</b>	<b>Cyclical</b>	<b>High-employment</b>
	(1)	(2)	(3)
<i>Net lending, 2009 (billions of dollars)</i>			
General government	−1,579	−474	−1,105
Federal government	−1,451	−381	−1,070
State and local governments	−128	−93	−35
<i>Net lending, 2009 (percent of actual GDP)</i>			
General government	−11.1	−3.3	−7.7
Federal government	−10.2	−2.7	−7.5
State and local governments	−0.9	−0.7	−0.2

Note: The CBO estimated potential GDP in 2009 to be 15,275 billion dollars and the GDP gap to be 6.75 per cent.

Figure 3C

**Estimates of Cyclical Deficits by Government**  
(percent of potential GDP)



Note: A positive GDP gap implies actual GDP is less than potential GDP.

quarters. Thus, after eight quarters the GDP response to a shock is mitigated by about 20 per cent. The implicit multiplier – that is the change in GDP divided by the change in the deficit – grows to about  $\frac{1}{2}$  after eight quarters. There are two reasons for the gradual increase in the buffering. First, in FRB/US the consumption response to lower taxes (and higher unemployment benefits) is phased in over time – this is a common feature of many estimated consumption equations. Second, the multiplier effects gradually increase, particularly because the federal funds rate is fixed in the two simulations. In the current recession, with the downward adjustment of the federal funds rate limited by the zero bound, monetary policy would not be able to offset the additional weakness if the automatic stabilizers were not available, but in most cases in history the absence of automatic stabilizers could have been offset by more aggressive monetary policy.

### 3 Discretionary policy actions

This section outlines fiscal impetus (FI), our measure of discretionary policy actions. Fiscal impetus is a bottom-up approach that involves developing a measure of each major type of budget action – for example, a cut in personal taxes or an increase in real government consumption – and aggregating them into a single fiscal indicator that quantifies the impulse to growth in real GDP coming from budget decisions. The weights used for the aggregation are based on estimates of the direct effects of budgetary actions on the growth of real GDP. For example, the weight applied to a reduction in personal taxes is based on an estimate of the increase in aggregate consumer spending induced by the tax cut – that is, the MPC. Thus, fiscal impetus is model dependent. Our measure is designed to quantify the first-round effects of policy changes on GDP growth. It does not take

account of subsequent multiplier effects. It also explicitly excludes the effects of cyclical movements in taxes and transfers (*i.e.*, FI captures only discretionary policy actions). Two key uncertainties in constructing FI are the timing of the response and the size of the MPCs. In general we time the impetus with the implementation of the policy, rather than with the enactment. For example, the effect of defense spending occurs when the purchases are recorded in the NIPA and consumers are assumed to react to tax cuts when they observe the lower payments. Some studies, such as Auerbach (2003), instead base the timing on when the policy is enacted. It is our judgment that the empirical literature finds very little support for quantitatively important announcement effects on aggregate demand.<sup>7</sup> Our MPC estimates are consistent with the coefficients in the macroeconomic models used by the Federal Reserve Board staff.

### 3.1 Federal

Starting with discretionary tax changes, we assume that such changes are permanent unless they are explicitly designed to be temporary. Our measures of the real demand effects are based on estimates of the budget effects of the tax law changes deflated by the appropriate deflator (consumption or investment).<sup>8</sup> For personal or social insurance tax cuts we utilize an MPC of 0.7 and phase it in over two years following the date of implementation. For temporary tax changes we assume an MPC of 0.25 in the current quarter and 0.05 in the following quarter, consistent with studies of recent one-time rebates.<sup>9</sup> For corporate tax law changes there can be two effects: the normal income channel as well as the incentive channel. For general corporate tax cuts we assume an MPC of 0.5. For changes in investment incentives, such as the two recent partial expensing provisions, we are guided by the results from House and Shapiro (2008) and Cohen and Cummins (2006) and assume a small effect on investment demand.

Turning to expenditures, all changes in real purchases of goods and services (which excludes transfers) are considered discretionary because they are controlled by annual appropriations. These receive a weight of one. We assume an MPC of 1.0 for legislated changes in transfer payments (except for one-time payments which are treated like temporary tax cuts) and we exclude the endogenous changes in transfers owing to demographic factors, automatic cost-of-living adjustments and other economic factors. The higher MPC for transfers than for taxes reflects the fact that most transfers go to lower-income households, which are more likely to be liquidity constrained or follow rule-of-thumb behavior than the taxpaying population as a whole.

Grants to state and local governments, which are considered to be part of *Federal* FI at the time they are spent by the state and localities, are problematic because the degree and timing of the state and local response is not well understood. We assume that the states and localities spend the funds over the following two years. This is consistent with the flypaper effect, but overstates the response if states and localities react to increased grants by cutting taxes.<sup>10</sup> Our assumptions about the state and local reaction to grants is important only in assigning stimulus actions to the federal or

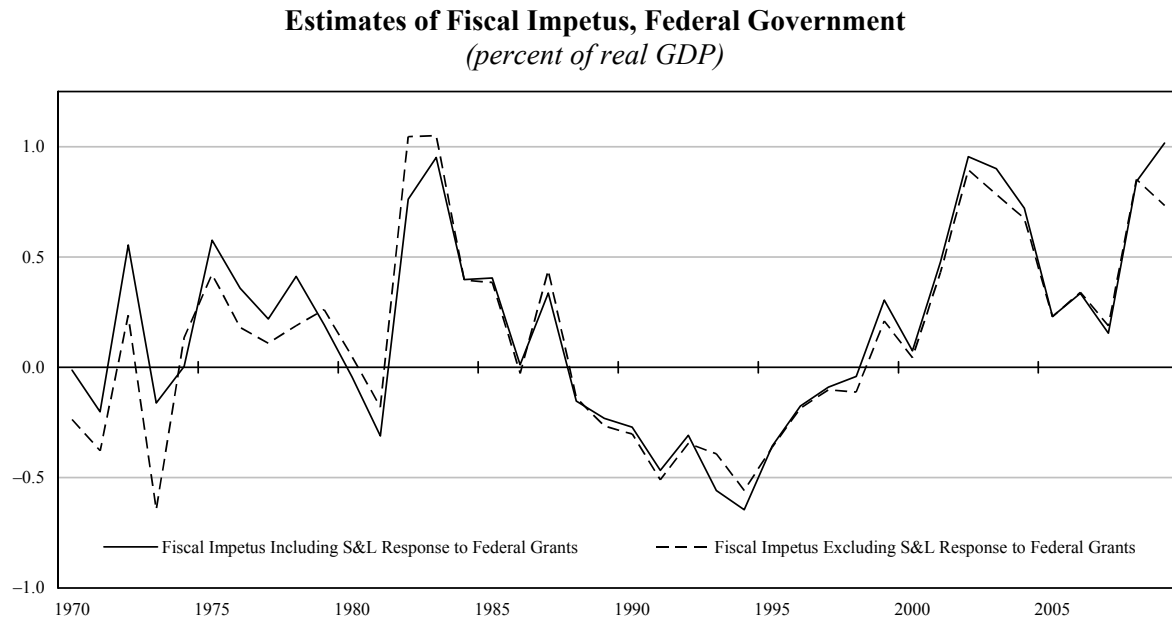
<sup>7</sup> For example, the consumption literature, in general, finds rule of thumb behavior by many consumers but little support for Ricardian behavior. Survey evidence shows little awareness of tax law changes. By contrast, there is some support for anticipatory changes in taxable income to tax law changes: During the early 1990s, year-end bonus payments were shifted to lower tax burdens in response to a series of tax increases. Actual labor supply probably did not change much.

<sup>8</sup> Our estimates for legislated changes to taxes or transfers come from a variety of sources, including the Congressional Budget Office and the Administration's budget. We then translate these estimates into the accounting framework of the national income and product account.

<sup>9</sup> See, Sahm, Shapiro and Slemrod (2009), Coronado, Lupton and Sheiner (2005) and Johnson, Parker and Souleles (2004).

<sup>10</sup> See Knight (2002) and Lutz (2010) for recent studies of the response of state and local governments to changes in grants which find that state and local governments respond to increased grants by cutting taxes. In this case the MPC would be closer to 0.7, the MPC of a tax cut.

Figure 4A



state and local level. At the general government level, FI does not depend much on the grant assumptions.<sup>11</sup>

Figure 4A shows our estimates for federal fiscal stimulus. Several observations jump out. Federal fiscal policy does appear to be countercyclical. Second, the amount of stimulus in any given year has been limited, with a boost to aggregate demand of about 1 percent of GDP being near the top. Third, note that the amount of stimulus in 2009 as a result of last year's budget actions is not much different than earlier in the decade when demand was boosted by tax cuts and defense spending increases. The portion of federal fiscal stimulus that owes to increased grants to the state and local sector is indicated by the distance between the dashed and solid lines and this amount will be subtracted from state and local actions to determine their contribution. Table 6 shows federal fiscal impetus around business cycle peaks; it shows the impulse to growth in real GDP from the Federal sector during the two years up to and including the peak and during the three years after the peak. In general, federal fiscal policy has been more stimulative after the peak than before it, thus moderating the economic downturns. The exception was following the 1990 peak when policy was focused on long-term deficit reduction.

Our measure of fiscal stimulus registers a positive value when fiscal policy is boosting aggregate demand. Alternatively FI could be measured relative to whether policy is inducing growth above or below that of potential GDP. In that context, a neutral fiscal stance corresponds to the impetus to GDP growth that would emanate if each component of taxes and expenditures were to grow at the rate of potential GDP. In such a case, the impetus from taxes and transfers would be zero and the impetus from purchases would equal the rate of growth of real potential GDP times the share of Federal purchases in GDP. Under a neutral fiscal stance, the Federal government share of GDP would remain constant. For the federal sector neutral FI would be approximately 0.2 (CBO's estimate of potential GDP growth is about 2.5 and Federal purchases are about 8 per cent of GDP).

<sup>11</sup> The impetus we attribute to an increase in federal grants is deducted from our measure of state and local impetus. For instance, if we overestimate the state and local grant spendout rate, we will mechanically underestimate spending from state and local own source revenue. Thus, general government FI is largely unaffected even if states use the grants to fund tax cuts.

Table 6

**Fiscal Impetus Around Business Cycles**  
(percent of GDP)

Peak Year	1969	1973	1980	1990	2000	2007	Average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Federal Government</b>							
Year before peak	0.02	0.55	0.19	-0.23	0.30	0.33	0.20
Peak	-0.77	-0.16	-0.04	-0.27	0.07	0.16	-0.17
1 year after	-0.01	0.00	-0.31	-0.47	0.48	0.84	0.09
2 years after	-0.20	0.58	0.76	-0.31	0.95	1.02	0.47
3 years after	0.55	0.36	0.95	-0.56	0.90	n.a.	0.44
Before	-0.38	0.20	0.07	-0.25	0.19	0.24	0.01
After	0.11	0.31	0.47	-0.44	0.78	0.93	0.36
<b>State and Local Government</b>							
Year before peak	0.89	-0.04	0.31	0.47	0.53	0.06	0.37
Peak	0.50	-0.04	0.17	0.52	0.38	0.27	0.30
1 year after	0.21	0.55	-0.21	0.24	0.55	0.04	0.23
2 years after	0.34	0.48	0.16	0.17	0.35	-0.39	0.18
3 years after	-0.04	-0.05	0.22	0.34	-0.19	n.a.	0.06
Before	0.69	-0.04	0.24	0.50	0.46	0.16	0.33
After	0.17	0.33	0.06	0.25	0.24	-0.17	0.15
<b>General Government</b>							
Before	0.31	0.16	0.31	0.25	0.65	0.41	0.35
After	0.29	0.64	0.52	-0.19	1.01	0.76	0.50

### 3.2 State and local

Whenever possible, we use direct information to construct our estimates of state and local “policy” actions – for example, we use figures from the National Association of State Budget Officers (NASBO) on enacted state revenue changes to estimate changes in state tax policy. However, we have no such sources for either local taxes or for state or local expenditures; thus, we have developed NIPA-based measures of policy change that we believe are satisfactory alternatives. With regard to property taxes, our policy indicator is the ratio of NIPA property tax receipts to nominal potential GDP, which we dub the effective property tax rate. When this effective tax rate is constant from one year to the next, policy is defined as being constant. Movements in the effective tax rate are interpreted as changes in policy; in general, they occur either because localities make adjustments to their *statutory* tax rates or because the rate of increase in average property assessments differs from the rate of overall inflation (as measured by the GDP price index). Thus, when property values rise rapidly and local governments do not offset the increases with decreases in the statutory tax rate, we score the change in revenue as a policy induced tax increase.<sup>12</sup>

<sup>12</sup> See Lutz (2009) for a discussion of the response of local governments to changes in real estate prices.

On the expenditure side, we define constant policy for Medicaid as a constant ratio of outlays (net of federal grants) to potential GDP, and we interpret deviations in this ratio as changes in policy.<sup>13</sup> We use a similar algorithm for other transfers. For purchases of goods and services, we include both consumption and investment expenditures and define constant policy as a constant real (i.e. inflation-adjusted) level of purchases. To measure the demand effect of discretionary changes taxes and transfers, we use the same MPCs as on the Federal side.

As with the federal sector we present two measures of fiscal impetus: with and without grants. In order to obtain an estimate for general government impetus, the solid line of federal impetus which includes the impact of grants to the states and localities (Figure 4A) should be added to the solid state and local line which excludes from impetus the impact of grants from the Federal government (Figure 4B). This avoids double counting the effect of grants. As Figure 4B indicates, state and local fiscal impetus varies a good deal from year to year, but is smaller than federal actions.

In terms of policy reactions, the middle panel of Table 6 focuses on the behavior of our state and local fiscal impetus measure around past business cycle peaks. In all six episodes, policy was expansionary leading up to the peak. During the period following the peak, the amount of stimulus usually diminished and was only about half as large, on average, as it had been in period leading up to the peak; the drop-off in fiscal impetus between the two periods amounted to about 0.2 per cent of GDP. This pro-cyclical response probably is the result of state and local balanced-budget requirements, which while not binding on a year to year basis, do enforce a significant level of budget discipline.

### 3.3 *Discretionary actions*

Fiscal impetus is our measure of the direct impact and does not incorporate any crowding out or crowding in. The total effect on the economy of discretionary actions reflects both the initial MPC as captured by FI as well as the multiplier (FI does not include multiplier effects and they therefore must be added to FI in order to obtain the full effect of discretionary actions). The multiplier depends upon the state of the economy both because of endogenous crowding out and due to monetary policy responses. The multiplier effects in FRB/US can range from under 1 to about 2. The multiplier is less than one when both monetary policy is assumed to try to offset the impetus (such as assuming that it follows a Taylor rule or other such reaction function) and the fiscal policy is a permanent increase in the deficit, (such as a permanent 1 percent increase purchases). In this case interest rates rise and the exchange rate appreciates dampening the demand effect. By contrast, when monetary policy is constrained by the zero bound and if policy actions are seen as temporary then the multiplier may be as large as 2. As a rule of thumb, a multiplier of about 1¼ would be generally appropriate if monetary policy is not offsetting fiscal policy and if the actions are temporary. This multiplier would be applied to FI, not to the original budget effect. In most discussions of fiscal policy the “multiplier” is a combination of the MPC and the follow-on effects. Here we address each piece separately.

## 4 **The budget and economic activity in 2008-09**

Since the current recession began at the end of 2007 both automatic stabilizers and discretionary fiscal policy have been at work to buffer the downturn in aggregate demand. In 2008, our measures indicate that policy actions raised real aggregate demand by about 1¼ per cent and

<sup>13</sup> We first adjust Medicaid outlays to their high-employment level to remove the cyclical changes from this program.

Figure 4B

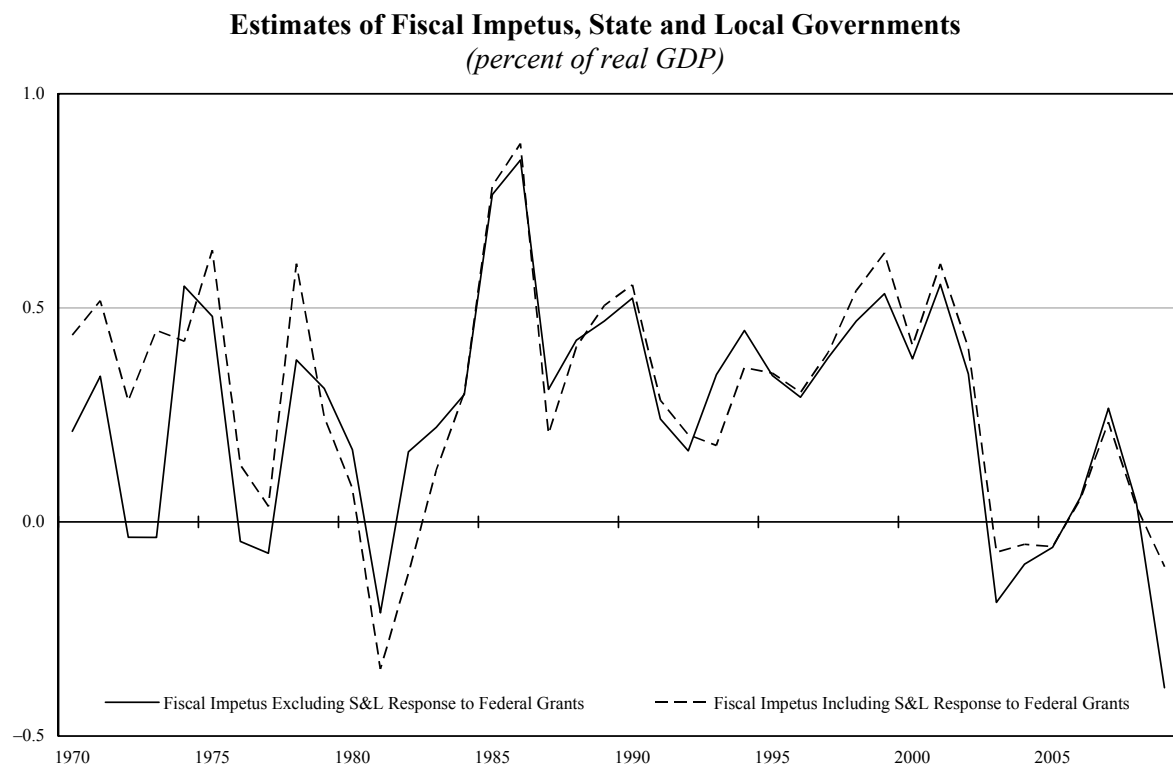
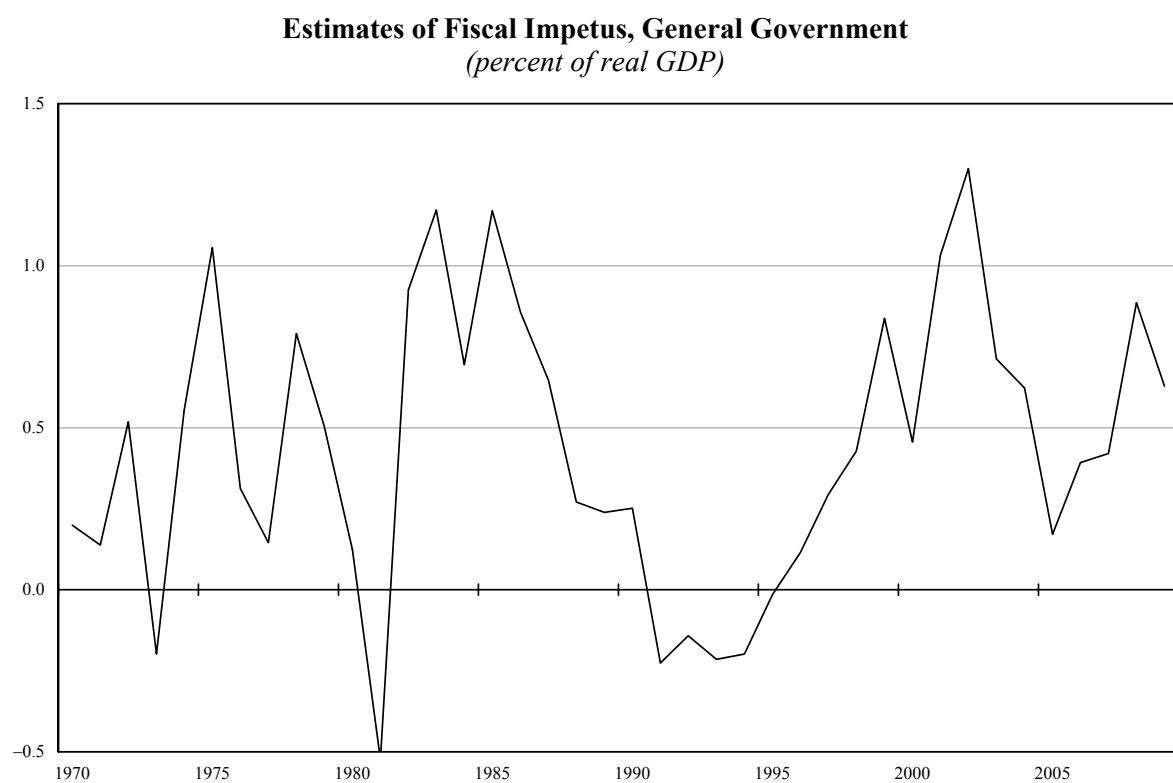


Figure 4C



the automatic stabilizers boosted demand by  $\frac{1}{4}$  per cent, on a year-over-year basis. The increase from discretionary policies in 2008 reflects continued increases in defense spending, stimulus spending, and other policies. In 2009 discretionary policy actions may have raised real GDP growth by  $\frac{3}{4}$  per cent, including the multiplier effects, and the automatic stabilizers may have contributed another  $\frac{1}{2}$  percentage point. All told, over the two years fiscal factors (discretionary and automatic) may have lifted the level of GDP by  $2\frac{3}{4}$  per cent in 2009.

First, consider the automatic stabilizers. They widened the 2009 deficit by about 3 per cent of GDP. FRB/US model simulations indicate that without the stabilizers, output would have been  $\frac{3}{4}$  percentage point lower on average in 2009. With the deficit 3 per cent of GDP larger and output  $\frac{3}{4}$  per cent higher the implicit multiplier is  $\frac{1}{4}$ . This is smaller than the figure derived from the simulation with a constant 1 percent shock. This is because the GDP gap widened in 2008 and 2009 whereas in the prior experiment it was held constant. Given that the effects on demand from lower taxes and higher transfers builds over time the implicit multiplier derived by dividing *current* quarter change in GDP by the *current* quarter change in the deficit will be lower than the value obtained when the shock is constant.

Second, discretionary fiscal policy actions by the federal government boosted aggregate demand directly by 1 percent in 2008 and another 1 percent in 2009. State and local actions, excluding those induced by federal grants (which are included in federal FI) had negligible impact on aggregate demand in 2008, and were contractionary by about  $-0.4$  per cent of GDP in 2009. The retrenchment by state and local government largely reflects the pro-cyclical response induced by balanced budget requirements alluded to above. Combining federal and state and local discretionary actions together yields 1 percent boost to GDP in 2008 and  $\frac{1}{2}$  per cent in 2009 leaving real GDP  $1\frac{1}{2}$  per cent higher in 2009. Applying a multiplier of 1.3 would yield about 2 per cent extra GDP in 2009.

Considerable attention has been given to the role of the portion of federal discretionary policies that were explicitly designed to stimulate the economy. During 2008 and 2009 numerous policies were enacted for stimulus reasons, the most prominent being the American Recovery and Reinvestment Act (ARRA) which passed in February 2009. Other policies include the 2008 temporary tax cut, the expansion and extension of unemployment benefits that have occurred several times, aid to first-time home buyers, the 2009 “Cash for Clunkers” program, and additional corporate tax relief. The Administration has proposed additional policies for 2010 and 2011, including extending several provisions that are slated to expire this year. Table 7 reports the significant elements of the enacted measures (including an assumed further extension of unemployment benefits). Personal tax cuts include a one-time rebate in 2008 and the “Make Work Pay” reduction in income taxes that began in April 2009 and which we assume will be treated by consumers as a permanent reduction in taxes, although it is slated to expire after 2010.<sup>14</sup> Transfers include increased unemployment benefits that have been part of five separate bills and which we assume will be extended again through the end of 2010. The third major piece of stimulus is increased grants to state and local governments for construction, education and general funds. Minor elements include temporary reductions in corporate taxes for partial expensing, and provisions to delay payment of taxes for several years through loss-carry-back and temporary indebtedness relief.

Figure 5 puts these on a national accounts quarterly basis and provides an estimate of fiscal impetus from stimulus legislation. In our judgment the aggregate demand effects of these provisions is more muted and drawn out than the budget effects. This reflects several factors. It is more muted because we assume temporary tax and transfers are mostly saved, particularly the

<sup>14</sup> We have excluded the temporary extension of AMT relief as it has been provided every year since 2003 and thus it has been previously incorporated in FI.



Table 7

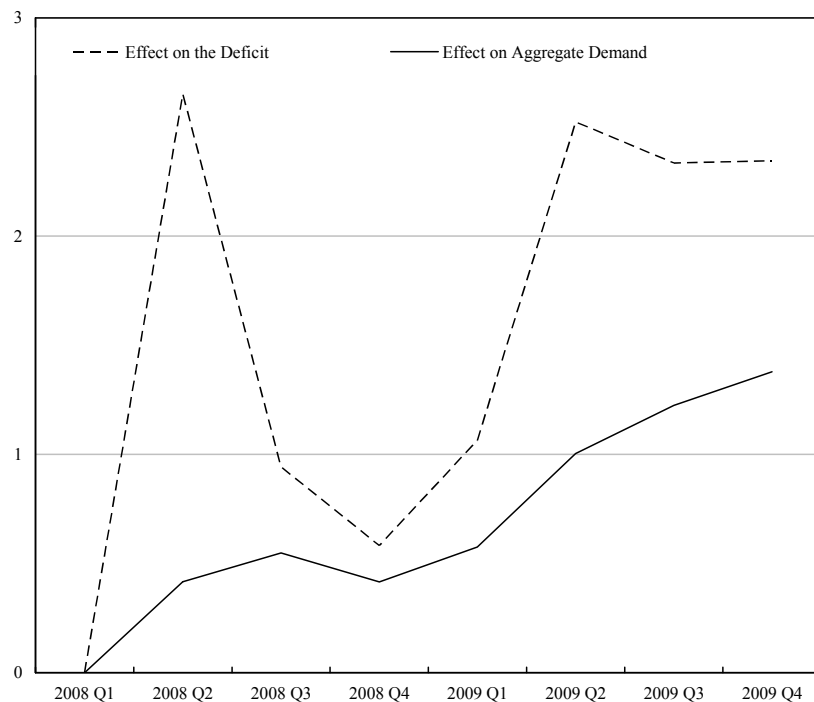
**Recent Federal Fiscal Stimulus Actions***(billions of dollars)*

	4-year Total	Calendar Year			
		2008	2009	2010	2011
	(1)	(2)	(3)	(4)	(5)
<b>Enacted</b>	<b>845</b>	<b>146</b>	<b>298</b>	<b>324</b>	<b>76</b>
Individual tax cuts*	298	96	81	104	16
Expanded UI and other transfers	144	8	80	50	6
Aid to state and local governments	202	0	71	97	34
Corporate and other tax cuts	117	42	49	32	-6
Other spending	85	0	18	41	26
<b>Proposed</b>	<b>271</b>	<b>0</b>	<b>0</b>	<b>133</b>	<b>138</b>
Total	1116	146	298	457	214

\* Excludes AMT relief, includes refundable credits.

corporate provisions, but also those for individuals. It is more drawn out because consumers phase in their response to the permanent tax cuts over several years. Moreover, we assume that state and local governments are expected to smooth out their spending response to the temporary boost in grants so that they will not have to make significant adjustments when the grants end at the end of 2010. Thus, the spending response is spread over the 2009-12 period rather than just 2009 and 2010. As a result of these assumptions, the aggregate “MPC” from

Figure 5

**Effects of Fiscal Stimulus Actions***(percent of GDP)*

the stimulus is well below one in 2009, but eventually cumulates to about 0.7. As shown in Figure 5, the direct effects of the stimulus actions raise GDP by  $1\frac{1}{4}$  per cent by the end of 2009; with a multiplier of 1.3 the total effect is about  $1\frac{1}{2}$  per cent.<sup>15</sup>

## 5 Conclusions

This paper provides quantitative estimates of the effects of the automatic stabilizers on the government budget and on the economy. We find that at the general government level each 1 percent increase in the GDP gap increases the deficit by 0.45 per cent of GDP with 0.35 per cent of GDP occurring at the federal level. According to simulations with FRB/US, the automatic stabilizers provide a moderate amount of buffering of aggregate demand shocks. The stabilizers attenuate the effects on aggregate demand by about 10 per cent after four quarters and 20 per cent after eight quarters. Turning to active fiscal policy, the federal government has engaged in countercyclical policies following most business cycle peaks. This has been offset to some degree by tightening at the state and local level. During 2008-09, the combined effects of federal and state and local budgets on aggregate demand (from both discretionary actions and automatic stabilizers) may have lifted the level of GDP by  $2\frac{1}{2}$  per cent in 2009.

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<sup>15</sup> There are a wide range of projections of the effect of the ARRA portion of the stimulus. For example, the Council of Economic Advisors estimates that the year-over-year effect is about 1 percent in 2009 and report that the forecasts from major Wall Street forecasters range from 0.7 to 1.3 per cent, with the fourth quarter level ranging from 1.5 to 2.5 per cent.

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## FISCAL POLICY IN LATIN AMERICA: COUNTERCYCLICAL AND SUSTAINABLE AT LAST?

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*This paper analyses fiscal policy for several economies in Latin America, from the early-Nineties to the 2009 crisis. We present original estimates of cyclically-adjusted public revenues for Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay implementing the standardised OECD methodology and extending it to include commodity cycles, which have a direct and significant effect on the fiscal balance of several Latin American countries. Based on these estimates, we evaluate the size of automatic tax stabilisers and the cyclical policy of discretionary fiscal policy. Additionally, we highlight the uncertainty stemming from the estimation of the output gap, due to large and simultaneous cyclical, temporary and permanent shocks in several Latin American economies.*

### 1 Introduction

In reaction to the 2009 global financial crisis, most industrialised and several emerging economies enacted Keynesian-type fiscal packages (from personal income tax cuts and indirect taxes reductions, to higher infrastructure spending and transfers to local governments, families, and firms) to mitigate the collapse of domestic demand.

Several Latin American economies faced the international crisis on relatively solid domestic macroeconomic grounds, both monetary and fiscal. Monetary policy had gained credibility during the decade, as several independent Central Banks moved towards inflation targeting regimes. On the fiscal front, most countries in the region displayed higher budget surpluses and lower debt-to-GDP levels, giving them apparently unprecedented fiscal margins to pursue sustainable counter-cyclical fiscal policies, of a similar size of those in OECD countries (see Figure 1 and OECD, 2009b).<sup>1</sup>

But, is Latin America's resilience in 2009 a permanent change in paradigm? The success of these counter-cyclical fiscal policy responses in Latin American economies is still unclear, and will largely depend on both the size of the programmes actually implemented (generally smaller and with greater lags than announced) and their effective impact (opening, once again, the debate on multipliers). Besides, at the wake of the international financial crisis there was no consensus on the cyclical or structural nature of still recent fiscal improvements.<sup>2</sup>

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The views expressed herein are the sole responsibility of the authors and do not reflect the opinions of the OECD, its Development Centre, or the governments of their member countries.

<sup>1</sup> This strength was in stark contrast with previous episodes. See Gavin and Perotti (1997) and Gavin and Hausmann (1998) for Latin America, and Talvi and Vegh (2005), Kaminsky *et al.* (2006), and Ilzetzki and Vegh (2008) for emerging markets in general.

<sup>2</sup> Izquierdo and Talvi (2008), from the Inter-American Development Bank, argued that if revenues from the seven largest economies in Latin America countries were adjusted using the implicit Hodrick-Prescott filter parameter for Chile (*i.e.*, the smoothing coefficient on revenues that would render a structural surplus of one per cent of GDP since 2001), structural fiscal balances in the region, with the exception of Chile, did not differ significantly from their situation at the onset of the 1998 Russian crisis. Using a (continues)

Our paper joins the latter debate. In Section 2 we present updated original estimates of cyclically-adjusted fiscal balances for a number of Latin American countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay. We track these balances since the early-Nineties to 2009, implementing the standardised OECD methodology (Girouard and André, 2005, and Van den Noord, 2000), but adding the fiscal impact of commodity prices (following basically the IMF approach in Vladkova and Zettelmeyer, 2008). With these estimates, we can then measure the size of automatic stabilisation tax policies and the size and cyclicity of discretionary fiscal policy. These measures are compared with those in OECD countries and used to discuss the cyclicity of discretionary fiscal policy in the region, differentiating countries and periods. Additionally, based on these numbers we perform standard debt sustainability exercises. The third section explains the methodology used to estimate the output gap. We opt for an unobserved components model to decompose shocks into permanent, cyclical and transitory. Section 4 concludes, underlining the importance of output gap estimates, the inclusion of commodity prices and the consideration of automatic fiscal responses in the design of sustainable fiscal policies over the business cycle in the region.

## 2 Cyclically-adjusted budget balances in Latin America

### 2.1 OECD approach to estimation of cyclically-adjusted fiscal revenues

As a starting point, we apply the OECD approach to account for the automatic impact of the business cycle on public accounts, as presented in detail by Girouard and André (2005) for OECD countries, and De Mello and Moccero (2006) for Brazil. This method computes separately the cyclical component of unemployment-related transfers and of public receipts from four types of taxes: personal income tax (PIT), social security contributions (SSC), and corporate income tax (CIT), and indirect taxes (IT), and of unemployment-related transfers.

Focusing on public revenues, the cyclical response of tax  $i$  to the business cycle (labelled  $\varepsilon_{ti,y}$ ) is calculated as the product of two elasticities: the elasticity of tax receipts to the tax base (labelled  $\varepsilon_{ti,tbi}$ ) and the elasticity of the tax base to the economic cycle (labelled  $\varepsilon_{tbi,y}$ ):

$$\varepsilon_{ti,y} = \varepsilon_{ti,tbi} \times \varepsilon_{tbi,y} \quad (1)$$

where  $i$  covers the four taxes mentioned above (PIT, SSC, CIT or IT) or their respective tax bases (wage bill for the first two, corporate profits and consumption).

On the expenditure side, the adjustment is usually made at the level of total primary spending as time-series data on unemployment-related expenditure are not available across countries. Girouard and André (2005) use several OECD instruments, publications and databases, especially the *Annual National Accounts*, the *Economic Outlook* database, national *Labour Force Surveys*, the *Taxing Wages* model, and *Revenue Statistics*. Next, we describe the methodology more in depth while explaining the approach we follow for Latin American economies.

#### 2.1.1 Personal income tax and social security contributions

To calculate the elasticity of income tax and social security contributions with respect to the tax base, the marginal and the average tax rates of a representative household are calculated for several points in the earnings distribution: from 0.5 to 3.0 times the average production worker in

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different methodological approach, Vladkova-Hollar and Zettelmeyer (2008), from the International Monetary Fund, observed an improvement in structural balances in most countries, although they point out that commodity prices added a significant layer of uncertainty.

each OECD country. A representative household is defined as a full-time, two-earner married couple with two children, with the secondary earner receiving 50 per cent of the wage of the principal earner. Effective tax rates are computed using the OECD *Taxing Wages* simulator, while the distribution of tax payers across income levels in each country are based on labour market statistics (based on median, first and ninth deciles incomes taken from *Labour Force Surveys*). The overall elasticities of both PIT and SSC with respect to the tax base ( $\varepsilon_{ti,thi}$ ) are calculated as the weighted ratios of marginal and average tax rates:

$$\varepsilon_{ti,thi} = \left( \sum_{i=1}^n \gamma_i MA_i \right) / \left( \sum_{i=1}^n \gamma_i AV_i \right) \quad (2)$$

where  $\gamma_i$  is the share of earners  $i$  in the income distribution,  $MA_i$  is the marginal income tax rate or social security contribution rate at earning level  $i$ , and  $AV_i$  stands for the corresponding average rate.

Due to the lack of comparable databases and instruments, this procedure poses significant challenges when applying them to Latin America. We proxy the distribution of potential tax payers using the latest available National Household Surveys<sup>3</sup> in Argentina (referred to 2006), Brazil (2006),<sup>4</sup> Chile (2006), Colombia (2008), Costa Rica (2006), Mexico (2006), Peru (2006), and Uruguay (2005). In particular, we calculate the “adjusted first earner income” distribution taking into account household composition (if two earners exist, the first earner is assigned two thirds of household income while second earner is assigned the rest). We restrict our analysis to labour income (dependent and self-employed workers),<sup>5</sup> and limit the sample to households with at least some labour income.<sup>6</sup> Given the high levels of informality and income inequality in the region, we analyze an extended income interval, covering from 0.05 times average income (*i.e.*, almost from the first peso/sol/real of labour income) to more than six times average income.

Figure 1 represents the average adjusted income level and those corresponding to the first and ninth deciles, corrected by purchasing power parities. Average annual labour income level ranges from 7,700 \$ PPP in Peru, to nearly 14,600 \$ PPP in Chile. Workers in the ninth decile earn more than twice the average in all countries, while low earners vary significantly (in Peru, those in the first decile earn 20 times less than the average income, while only five times less in Costa Rica).

Focusing on the distribution of labour income earners, the analysis shows a high concentration of workers below the average labour income: between 60 and 70 per cent of labour income earners earn less than the national average (Figure 3). The Peruvian income distribution represents an outlier, given the concentration of income earners at lower levels. This fact has a very significant impact on the number of effective tax payers and fiscal revenues.

These national labour income distributions provide the weights ( $\gamma$ ) to compute the overall average and marginal personal income and social security tax rates. We calculate the effective tax burden for representative households, assuming they only differ in their income level (from 0.05 to

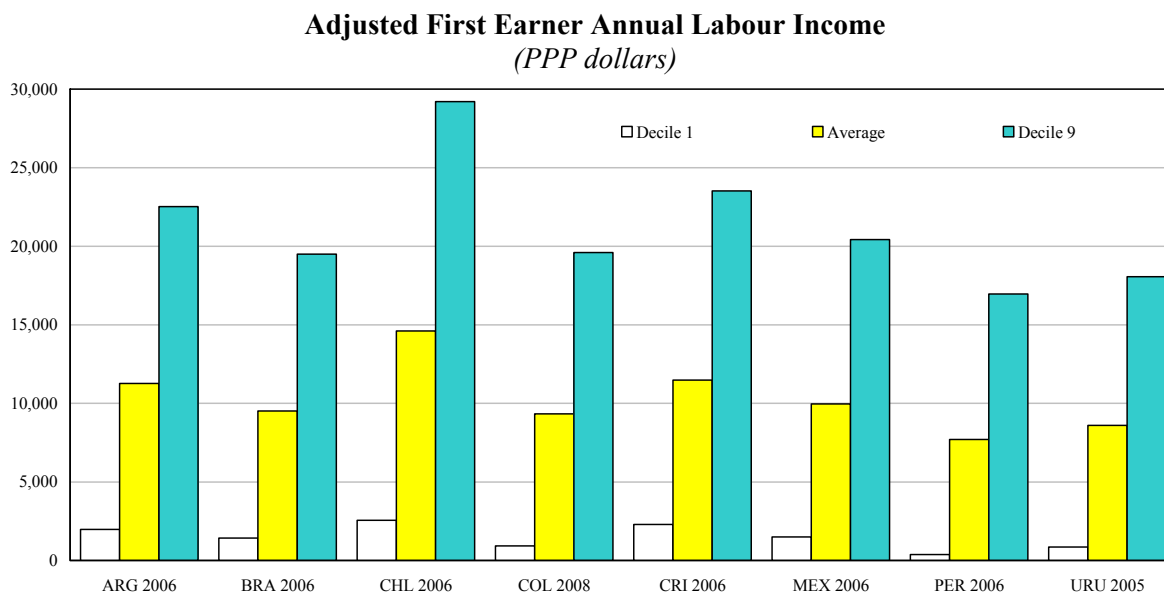
<sup>3</sup> Encuesta Permanente de Hogares in Argentina, Pesquisa Nacional por Amostra de Domicílios in Brazil, Encuesta de Caracterización Socioeconómica Nacional in Chile, Gran Encuesta Integrada de Hogares in Colombia, Encuesta de Hogares y Propósitos Múltiples in Costa Rica, Encuesta Nacional de Ocupación y Empleo in Mexico, Encuesta Nacional de Hogares in Peru and Encuesta Continua de Hogares in Uruguay. We are aware of the potential limitations from using survey data, in contrast to administrative records, but, on the other hand, household surveys are more generally available. As a future extension of this research, we will test the robustness of the results using alternative income distribution sources.

<sup>4</sup> Brazil is included to establish a link between previous OECD research and our regional analysis. In the following sections we will report analysis based on elasticities calculated by De Mello and Moccero (2006).

<sup>5</sup> As already established in the OECD method, this does not represent a significant bias for Latin America, since capital income is usually not taxed by the personal income tax.

<sup>6</sup> According to our calculations based on the National Household Surveys, between 8 and 26 per cent of households in the selected Latin American countries do report no labour income (26.1 in Argentina, 15.6 in Brazil, 11.4 in Chile, 11.5 in Colombia, 15.0 in Costa Rica, 7.7 in Mexico, 9.2 in Peru, and 22.0 in Uruguay).

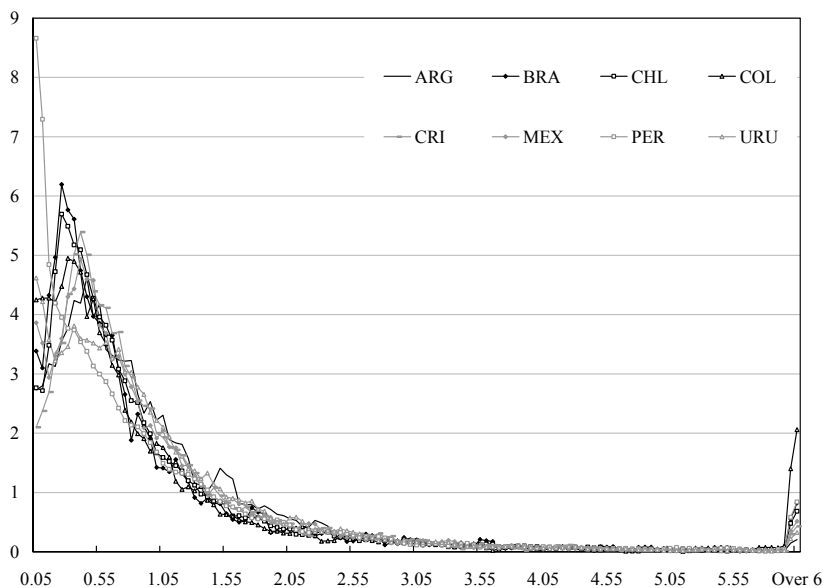
Figure 1



Source: Authors' calculations based on National Household Surveys.

Figure 2

**Labour Income Distribution in Latin American Countries**  
(percent)



Note: Percentage of people by household labour income level.

1 represents the national average.

Source: Authors' calculations based on National Household Surveys.

more than 6 times the national average).<sup>7</sup> Chilean and Uruguayan figures were provided by the respective Ministries of Finance, while Mexican rates were calculated using the OECD *Taxing Wages* simulator. For other countries, we calculated the fiscal figures based on the legislation in place during the corresponding fiscal year.

Calculations are referred to 2006, because several of the household surveys available are from that year, and as it corresponds to a relatively neutral year in cyclical terms (in the case of Colombia, we

<sup>7</sup> To be precise, we liquidate these two taxes for 121 levels of income (so  $i=1 \dots 121$ ). We grouped all households that earn more than six times the national average (this last bracket earns between eight times the average in Uruguay, to 11 times in Chile).

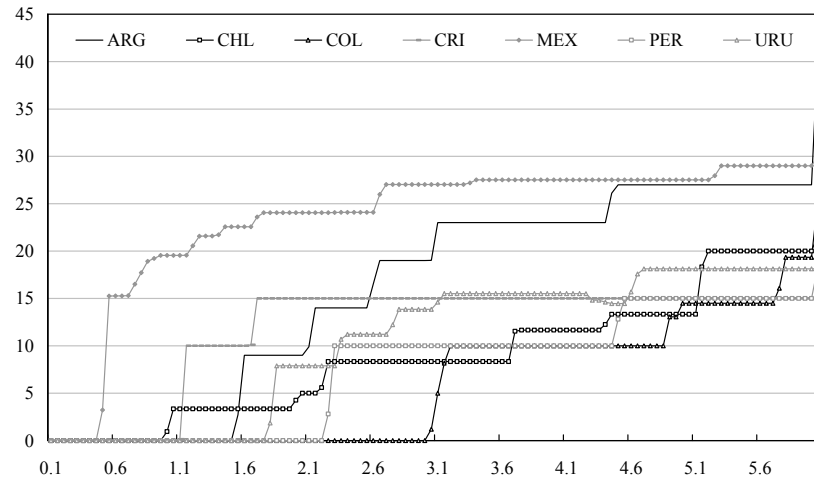


deflated the data referred to 2008 with the national CPI). The only exception is Uruguay, in which we updated survey figures with observed CPI up to 2009 to incorporate the new personal income tax established in 2008. In those cases where fiscal legislation allows individual and household declaration, we chose the one more beneficial to tax payers, including allowances for both spouse and children, if existing.<sup>8</sup> Figures 3 and 4 show the effective marginal and average personal income tax rates by income levels.

As shown in Figure 4, the personal income tax in all these Latin American countries is formally progressive, since average tax rates increase with income levels. Second, with the exception of Mexico (due to the interaction of exempted income, individual declarations and tax credits), labour income earners are net payers of the PIT starting at levels ranging from the average income in Chile to three times the average income in Colombia. Together with informality, these high levels imply that only a small share of households with labour income is a net PIT payer.

**Figure 3**

### Marginal Personal Income Tax by Income Levels (percent)



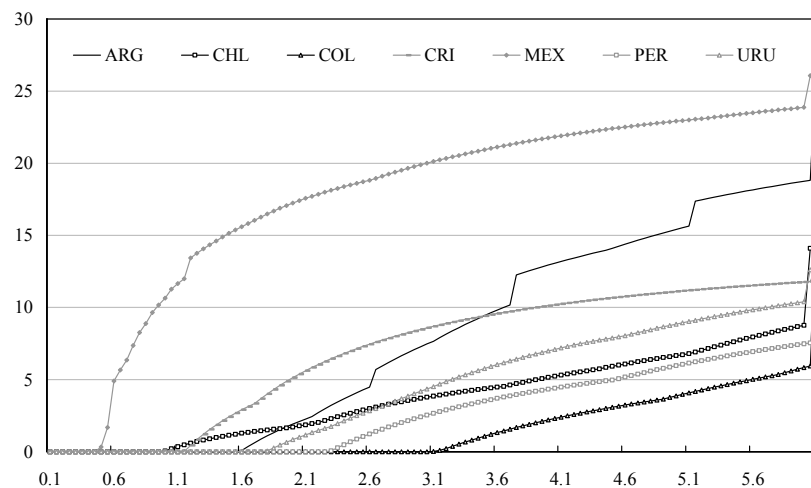
Note: Marginal tax rate by household labour income level.

1 represents the national average.

Source: Authors' calculations based on OECD's *Taxing Wages* (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

**Figure 4**

### Average Personal Income Tax by Income Levels (percent)



Note: Average tax rate by household labour income level.

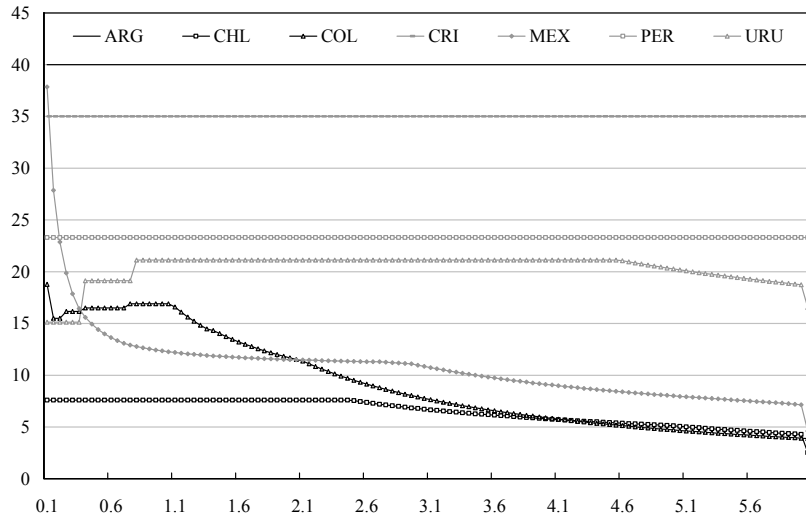
1 represents the national average.

Source: Authors' calculations based on OECD's *Taxing Wages* (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

<sup>8</sup> Tax declarations are at the individual level in Chile, Colombia, Peru and Uruguay, and by households in Argentina, Costa Rica and Mexico. Argentina and Mexico figures incorporate spouse and children allowances. Brazilian figures, taken from De Mello and Moccero (2006), are on an individual basis. Therefore, we fix both income distribution and tax legislation, as stated in the OECD methodology. As a future extension, we plan to test the effects on tax elasticities of changes in the tax code, and of variations of income distribution.

Figure 5

**Average Social Security Contributions by Income Levels**  
(percent)



Note: Average tax rate by household labour income level.

1 represents the national average.

Source: Authors' calculations based on OECD Taxing Wages (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

By contrast, as shown in Figure 5, social security contributions tend to be flat taxes, or even slightly regressive given the existence of minimum contributions in Mexico. Chile and Mexico are the only two countries with a fully privatized pension system, where social contributions mainly finance health benefits.<sup>9</sup>

As defined in equation (2), the wage elasticity of PIT and SSC is calculated as the ratio between the weighted marginal tax rate, and the weighted average tax rate (included in fifth and sixth columns in Table 1). With the exception of Mexico, PIT elasticities are between 2.5 and 3.3.

These levels are higher than those observed in OECD countries, and slightly lower than the 3.4 found for Brazil in De Mello and Mocero (2006). In other words, formal progressivity of the PIT is higher in Latin America. On the other hand, SSC elasticities are very much in line with OECD estimates, except Mexico and Colombia, where they are significantly lower.

To calculate the overall elasticities, the second step involves the econometric estimation of the sensitivity of the relevant tax bases with respect to the output gap ( $\varepsilon_{tbi,y}$ ). As in Girouard and André (2005), the cyclical sensitivity of the wage base (PIT and SSC tax base) has been estimated using an equation that links directly the cyclical component of the wage bill to the output gap. We regress the share of the real wage bill in potential GDP (constructed with active population from the *Penn World* tables, and unemployment and urban workers wages from ECLAC) on the output gap (estimated using unobserved components model on real chained GDP series from *Penn World* tables as described in Section 3) and a constant, in logs with annual data from 1981 to 2007 (see details in Annex 1).

$$\Delta \ln(W_t L_t / Y_t^*) = \alpha + \varepsilon_{tbi,y_t} \times \Delta \ln(Y_t / Y_t^*) + \mu_t \quad (3)$$

The estimated responsiveness of the wage bill for Uruguay, Colombia (taken from Lozano and Toro, 2007) and Argentina (around 1.0) are slightly above the OECD average (0.7 according to Girouard and André, 2005), and Brazil (0.8 reported by De Mello and Mocero, 2006), while elasticities for the rest are significantly above previous estimates (up to 2.0 in Peru). Details on the estimations are also included in Annex 2.

<sup>9</sup> Mexican contributions cover sickness, disability and nursery, while Chilean rates cover health and unemployment. In the other cases contributions finance both health and pensions. In the case of parallel public-private compulsory pension systems (Argentina, Colombia, Peru and Uruguay), we assumed that the worker is affiliated to the public scheme.

Table 1

## Marginal and Average Tax Rates

Country	Marginal Tax Rate		Average Tax Rate		Real Wage Elasticity of	
	PIT	SSC	PIT	SSC	PIT	SSC
	$X$		$Y$		$Z = X/Y$	
<b>Argentina</b>	<b>2.9</b>	<b>39.3</b>	<b>0.9</b>	<b>40.0</b>	<b>3.3</b>	<b>1.0</b>
<b>Brazil</b>	-	-	-	-	<b>3.4</b>	<b>1.8</b>
<b>Chile</b>	<b>1.7</b>	<b>6.9</b>	<b>0.7</b>	<b>7.5</b>	<b>2.5</b>	<b>0.9</b>
<b>Colombia</b>	<b>0.9</b>	<b>5.7</b>	<b>0.3</b>	<b>10.9</b>	<b>2.5</b>	<b>0.5</b>
<b>Costa Rica</b>	<b>3.4</b>	<b>34.3</b>	<b>1.3</b>	<b>35.0</b>	<b>2.6</b>	<b>1.0</b>
<b>Mexico</b>	<b>13.7</b>	<b>8.8</b>	<b>7.0</b>	<b>17.5</b>	<b>2.0</b>	<b>0.5</b>
<b>Peru</b>	<b>1.1</b>	<b>22.6</b>	<b>0.4</b>	<b>23.3</b>	<b>2.7</b>	<b>1.0</b>
<b>Uruguay</b>	<b>1.6</b>	<b>20.0</b>	<b>0.5</b>	<b>19.0</b>	<b>3.2</b>	<b>1.1</b>
Canada	28.6	7.8	18.3	9.7	1.6	0.8
France	13.9	34.9	8.2	30.7	1.7	1.1
Germany	26.2	23.9	11.4	31.1	2.3	0.8
Italy	26.3	26.5	13.2	27.6	2.0	1.0
Japan	9.6	18.7	4.9	20.5	1.9	0.9
Korea	8.5	11.2	3.6	13.1	2.3	0.9
Spain	20.2	18.3	9.5	24.1	2.1	0.8
United Kingdom	22.8	13.6	13.5	10.4	1.7	1.3
United States	19.1	11.6	10.3	12.8	1.9	0.9
OECD	21.8	19.0	12.7	18.8	1.7	1.0

Notes: Marginal and average rates are weighted by the distribution of tax payers across income levels. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations for Argentina, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay, De Mello and Moccero (2006) for Brazil, and Girouard and André (2005) for the rest.

Finally, we multiply both elasticities to obtain the overall tax elasticities. Table 2 collects the output elasticity of PIT and SSC in our selected Latin American countries, compared to those in selected OECD economies and Brazil. Given the higher elasticities of the wage bill to output gap, output elasticities of PIT are much larger in Latin America than those observed in OECD countries (3.5 on average vs. 1.2), and less in the case of SSC elasticities (1.2 on average vs. 0.7).

### 2.1.2 Corporate income tax

Concerning corporate taxes, we strictly apply the OECD methodology. Therefore, the cyclical sensitivity of the corporate tax base (proxied by corporate profits) is also a function of the elasticity of the wage bill relative to the output.

$$\varepsilon_{CIT,y} = (1 - (1 - PS) \varepsilon_{wl,y}) PS \quad (4)$$

where  $PS$  is the profit share in output proxied by the ratio of the gross operating surplus over GDP, and  $\varepsilon_{wl,y}$  is the elasticity of the wage bill to the output gap. Profit shares over GDP are taken from OECD *Annual National Accounts* in the case of Chile, from the national central banks in Costa

Table 2

**Elasticities of Personal Income Tax and Social Security Contributions**

Country	Real Wage Elasticity of		Output Elasticity of Wages	Output Elasticity of	
	PIT	SSC		PIT	SSC
	<i>A</i>		<i>B</i>	<i>C = A × B</i>	
<b>Argentina</b>	<b>3.3</b>	<b>1.0</b>	<b>1.1</b>	<b>3.6</b>	<b>1.1</b>
<b>Brazil</b>	<b>3.4</b>	<b>1.8</b>	<b>0.8</b>	<b>2.7</b>	<b>1.4</b>
<b>Chile</b>	<b>2.5</b>	<b>0.9</b>	<b>1.4</b>	<b>3.5</b>	<b>1.3</b>
<b>Colombia</b>	<b>2.5</b>	<b>0.5</b>	<b>1.1</b>	<b>2.6</b>	<b>0.6</b>
<b>Costa Rica</b>	<b>2.6</b>	<b>1.0</b>	<b>1.7</b>	<b>4.5</b>	<b>1.7</b>
<b>Mexico</b>	<b>2.0</b>	<b>0.5</b>	<b>1.5</b>	<b>3.0</b>	<b>0.8</b>
<b>Peru</b>	<b>2.7</b>	<b>1.0</b>	<b>2.0</b>	<b>5.3</b>	<b>1.9</b>
<b>Uruguay</b>	<b>3.2</b>	<b>1.1</b>	<b>0.9</b>	<b>2.8</b>	<b>0.9</b>
Canada	1.6	0.8	0.7	1.1	0.6
France	1.7	1.1	0.7	1.2	0.8
Germany	2.3	0.8	0.7	1.6	0.6
Italy	2.0	1.0	0.9	1.8	0.9
Japan	1.9	0.9	0.6	1.2	0.5
Korea	2.3	0.9	0.6	1.4	0.5
Spain	2.1	0.8	0.9	1.9	0.7
United Kingdom	1.7	1.3	0.7	1.2	0.9
United States	1.9	0.9	0.7	1.3	0.6
OECD	1.7	1.0	0.7	1.2	0.7

Notes: Change in tax revenues as a per cent of GDP for a 1 percentage-point change in the output gap. Based on weights for 2003 for OECD, and 2005-06 in Latin America. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations for Argentina, Chile, Costa Rica, Mexico, Peru and Uruguay, De Mello and Mocero (2006) for Brazil, and Girouard and André (2005) for the rest. Output elasticity of wages in Colombia is taken from Lozano and Toro (2007).

Rica and Uruguay, and from national statistics institutes in Argentina (INDEC), Colombia (DANE), Mexico (INEGI) and Peru (INEI). As shown in Table 3, output elasticities of CIT vary from 0.3 in Costa Rica to 1.2 in Uruguay, therefore lower than in OECD countries.

### 2.1.3 Other revenues, expenditures and overall balance

The output elasticity of the indirect tax base with respect to the economic cycle is set to unity for all countries, as in Girouard and André (2005). Finally, due to the lack of data and given the absence of unemployment benefits in many countries in the region, we suppose that current expenditures do not respond automatically to the cycle at all.

The cyclical budget response, as a share of GDP, can be expressed as the weighted sum of the four different tax revenues elasticities (based on the tax structure in 2006; see Table 8 in Annex 2). According to our calculations, the sensitivity (semi elasticity in GDP percentage points) of government budget balances to a 1 percentage point change in the output gap is 0.21

Table 3

## Elasticities of Corporate Income Tax

Country	Profits Elasticity of CIT	Profit Share in GDP	Output Elasticity of Wages	Output Elasticity of Profits	Output Elasticity of CIT
	$A$	$B$	$C$	$E = (1 - (1 - B) C) / B$	$F = A \times E$
Argentina	1.0	0.38	1.1	0.8	0.8
Brazil	1.0	0.54	0.8	1.2	1.2
Chile	1.0	0.54	1.4	0.7	0.7
Colombia	1.0	0.59	1.1	1.0	1.0
Costa Rica	1.0	0.49	1.7	0.3	0.3
Mexico	1.0	0.62	1.5	0.7	0.7
Peru	1.0	0.62	2.0	0.4	0.4
Uruguay	1.0	0.36	0.9	1.2	1.2
Canada	1.0	0.35	0.7	1.5	1.5
France	1.0	0.34	0.7	1.6	1.6
Germany	1.0	0.36	0.7	1.5	1.5
Italy	1.0	0.45	0.9	1.1	1.1
Japan	1.0	0.38	0.6	1.6	1.6
Korea	1.0	0.43	0.6	1.5	1.5
Spain	1.0	0.40	0.9	1.2	1.2
United Kingdom	1.0	0.31	0.7	1.7	1.7
United States	1.0	0.36	0.7	1.5	1.5
OECD	1.0	0.39	0.7	1.5	1.5

Notes: Change in tax revenues as a per cent of GDP for a 1 percentage-point change in the output gap. Based on weights for 2003 for OECD, and 2005-06 in Latin America. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations for Argentina, Chile, Costa Rica, Mexico, Peru and Uruguay, De Mello and Moccero (2006) for Brazil, and Girouard and André (2005) for the rest. Output elasticity of wages in Colombia is taken from Lozano and Toro (2007).

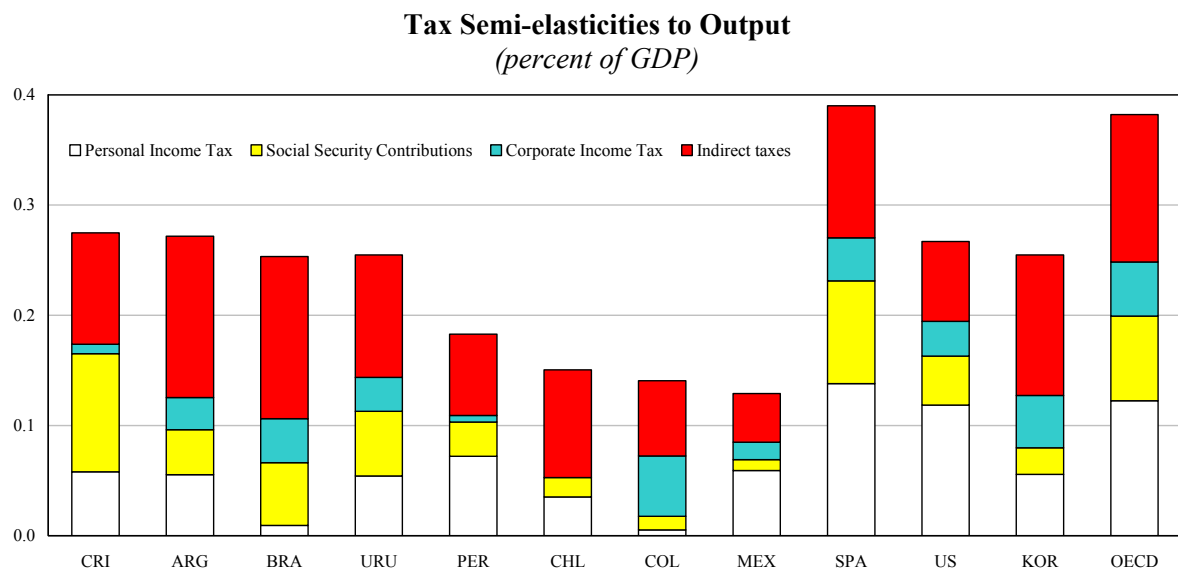
(unweighted average of the six Latin American economies), ranging from 0.12 in Mexico and 0.14 in Colombia, to 0.24 in Argentina and Uruguay, 0.25 in Brazil (De Mello and Moccero, 2006), and 0.26 in Costa Rica. This regional average is almost half the OECD average, and is explained by significantly lower automatic stabilization from PIT (Figure 6).

These estimates of the cyclical response of budget balance are positively correlated with the size of the government, as stated in the literature on fiscal macroeconomic stability in industrialized economies (see for instance Galí, 1994 and Fatás and Mihov, 2001). Nonetheless, as shown in Figure 7, some of the biggest economies in Latin America (notably Brazil, Colombia and Mexico) deviate significantly from their “expected” trends as automatic stabilisers are significantly lower than the government size (in part due to the high non-tax revenues).

## 2.2 Adjustment of tax and non-tax revenues for commodity prices

A special feature of several Latin American countries is the importance of commodity prices

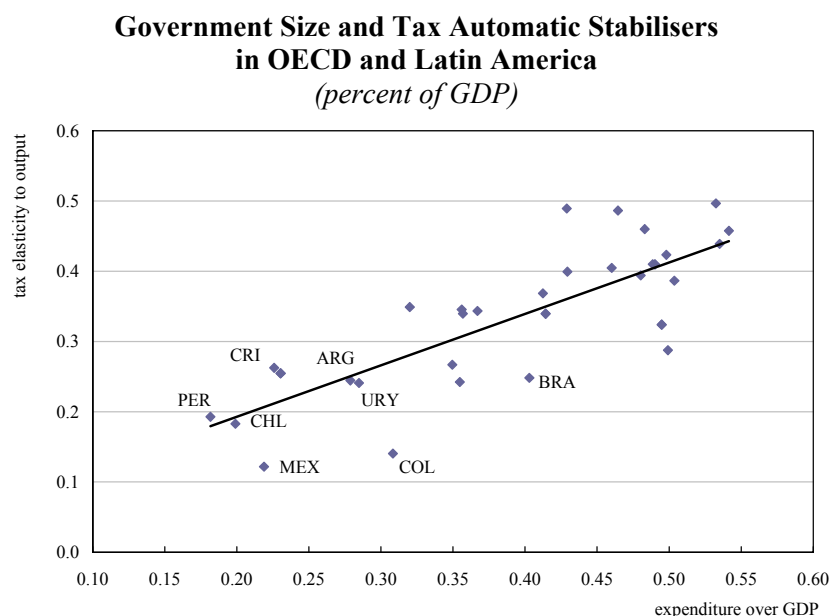
Figure 6



Note: OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations for Argentina, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay, De Mello and Moccero (2006) for Brazil, and Girouard and André (2005) for the rest.

Figure 7



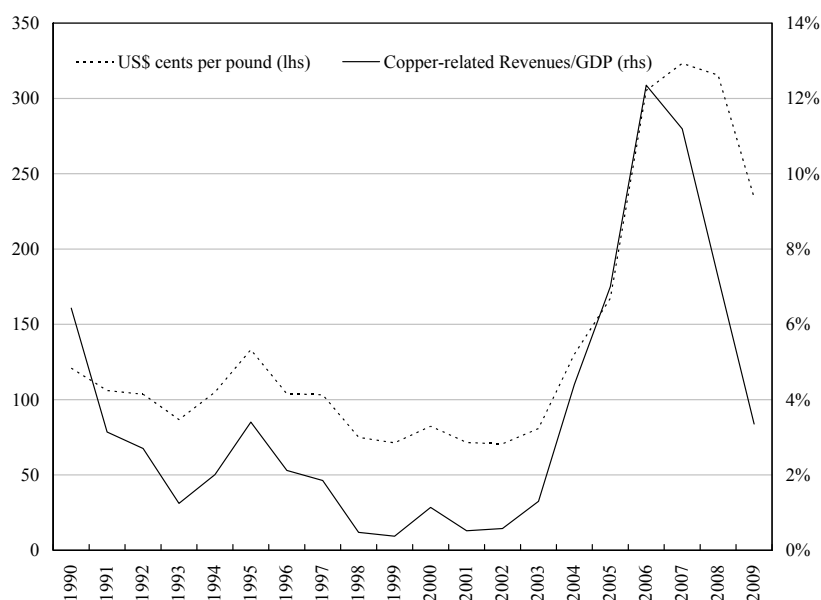
Source: Authors' calculations for Argentina, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay, De Mello and Moccero (2006) for Brazil, and Girouard and André (2005) for the rest.

for its fiscal accounts, whether it is due to a significant share of taxation linked to rents in natural resource extraction, or the utilities of state-owned enterprises in these sectors. Not only are commodity-linked revenues important as a source of revenue, but they also tend to be very volatile, primarily due to large fluctuations in prices. Therefore, they are also relevant for fiscal sustainability and macroeconomic stability (Avendaño *et al.*, 2008).<sup>10</sup>

<sup>10</sup> These authors show that the macroeconomic response to the latest Asian-driven commodity boom of exporting countries in Africa and Latin America has been fairly positive. In contrast to the Nineties, during 2000-05 African commodity-exporters have shown a more counter-cyclical fiscal stance, displaying various positive macroeconomic developments (notably, reserves accumulation, exports diversification, and improved credit profile). Results are more modest in Latin America.

Figure 8 shows copper revenues as a share of GDP in Chile from 1990 to 2009. Copper revenues during this period have risen from less than 0.5 per cent of GDP in 1999 up to more than 12 per cent of GDP in 2006. Compared with total revenues, these revenues are more than five times more volatile (copper revenues have a coefficient of variation of 1.01 versus 0.18 for total revenues). Thus, it is necessary to separate this source of income in countries where commodities are important for fiscal revenues and perform a special adjustment for commodity price fluctuations.

**Figure 8**  
**Copper Revenues as Share of GDP and the Price of Copper**  
(US dollars cents/pound)



Source: Authors' calculations based on DIPRES and COCHILCO data.

Unfortunately, the OECD methodology is silent regarding this issue.<sup>11</sup> Therefore, we follow a similar methodology to the Chilean fiscal rule (see Marcel *et al.*, 2001 and Rodríguez *et al.*, 2007) and recent IMF work on this topic in Latin America and the Caribbean (e.g., Vladkova-Hollar and Zettelmeyer, 2008). The adjustment is made for Argentina, Chile, Mexico and Peru.<sup>12</sup> In Argentina, we consider export taxes on agricultural goods introduced in 2002. For Chile, we consider revenues transferred to the central government from the public copper company (CODELCO) and revenues from specific taxes on private mining firms.<sup>13</sup> In the case of Mexico, we use international oil price data to adjust the value of transfers from the public oil firm (PEMEX) to the federal government, royalties and revenues of specific taxes on oil and petrol derivatives. It is important to point out that there are differences – due to data availability restrictions – between how we treat public enterprises in the commodity sector for Chile and Mexico. While for Chile we consider the general government, which implies that we do consider only the transfers and income taxes paid by CODELCO, for Mexico we used the non-financial public sector. Finally, in the case of Peru, we consider royalties and income taxes of the mining and fishing industries, adjusted by a weighted average (according to their share in revenues) of international copper, gold and fishmeal prices. In Annex 3 we present more details on the series and data sources.

<sup>11</sup> For Norway, OECD exercises are carried out using Norway-mainland fiscal and national accounts that exclude the oil and natural gas sector in a consistent way. There is no such information available for Mexico or Chile.

<sup>12</sup> Commodity prices are also important in the other countries studied here, but their impact on the fiscal accounts is mainly through the business cycle rather than an autonomous effect for these economies. For the case of Colombia, it is important to point out that energy and mining related revenues represent close to 1 per cent of GDP, but are expected to play an important role in the near future (see Comité Técnico Interinstitucional, 2010).

<sup>13</sup> Although other metals like molybdenum, gold and silver are also produced in Chile, copper remains by far the most important source of revenues.

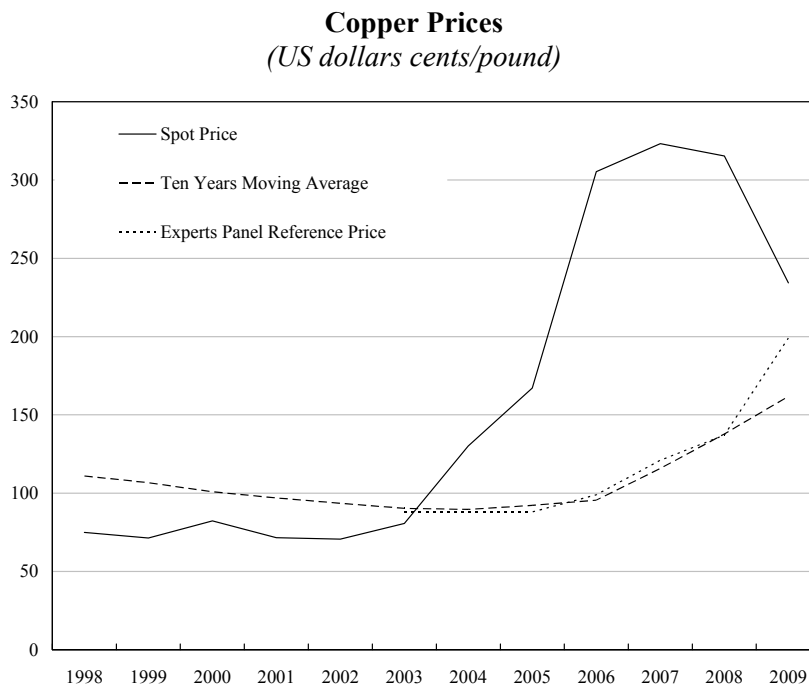
In terms of the adjustment, we first separate revenues (tax and non-tax) into revenues related to commodities and non-commodity revenues. The latter are adjusted as indicated in the Section 2.1 by the business cycle. For commodity-related revenues, we proceed as follows. Considering a spot price of  $p$  and a long-run price of the relevant commodity price  $p^*$ , structural commodity-linked revenues at time  $t$  are given by:

$$R_{s,t}^c = R_t^c \left( \frac{p_t^*}{p_t} \right)^\gamma \quad (5)$$

As Marcel *et al.* (2001) and Vladkova-Hollar and Zettelmeyer (2008), we consider a unitary elasticity, such that  $\gamma = 1$ . For  $p^*$ , we considered four different options, depending on available information: future prices, five-year-ahead forecasts, a 10-year moving average or a reference price set by a panel of experts (the case of copper in Chile). As shown in Figure 9 for the case of copper, a 10-year moving average coincides roughly with the forecasts of the experts' panel, with the exception of 2009. For the latest year, it seems that experts consider a larger fraction of the recent rise in copper prices to be persistent. We discard future markets, as they prove to be relatively small and shallow (probably with the exception of oil futures), and prices tend to be very volatile. In what follows, we report our results based on the 10-year moving average price. Commodity revenues are not separately adjusted by the output gap, given that commodity prices are already significantly linked to the business cycle.

As shown in Table 4, as of 2007 a large fraction of observed revenues linked to commodities were likely to be transitory. For Chile, around two thirds of the 11.2 percentage points of GDP linked to copper revenues were due to copper prices above its long-run price. The results for Argentina and Peru indicate that around half of commodity revenues could be considered transitory

**Figure 9**



Source: Authors' calculations based on data from Cochilco and London Metal Exchange.

in 2007, although the absolute magnitudes are smaller than for Chile or Mexico. For the case of Mexico, it would be around one third of the oil revenues that are linked to the oil price cycle (almost 4 per cent of GDP). This table also shows that the global economic crisis, and the consequent decline in commodity prices due to the collapse of global demand, had an important effect on some of the commodity-linked revenues in the region, but the effect is not homogeneous. In fact, while in 2009 commodity revenues in Chile declined significantly, in the other three countries the effect was considerably milder.



Table 4

## Commodity-linked Revenues

	Argentina	Chile	Mexico	Peru
<i>Percent of GDP (1)</i>				
1998	0.0	0.5	6.1	2.1
2003	2.5	1.3	7.4	2.5
2007	2.5	11.2	7.9	5.0
2009	2.9	3.4	7.4	3.8
<i>Percent of total revenues (2)</i>				
1998	0.0	2.1	29.8	11.1
2003	10.3	5.7	33.3	14.0
2007	8.6	37.9	35.4	23.7
2009	9.0	11.4	31.0	18.2
<i>Structural commodity revenues (percent of GDP) (3)</i>				
1998	0.0	0.7	9.9	3.4
2003	2.3	1.5	5.7	2.3
2007	1.5	4.0	3.9	2.5
2009	2.1	2.3	5.9	2.6
<i>Difference (3)–(1)</i>				
1998	0.0	0.2	3.8	1.3
2003	–0.1	0.2	–1.7	–0.2
2007	–1.0	–7.2	–4.0	–2.5
2009	–0.8	–1.0	–1.5	–1.2

Source: Authors' calculations based on national sources, IMF and ECLAC-ILPES and IDB data.

### 2.3 Main results

Including all these elements and using the share of each tax on GDP for general governments from ELAC-ILPES and IDB public sector databases of 2006 (except for Colombia and Uruguay, where we used central government data for 2006 and 2008 respectively), we can derive the adjusted balance  $b^*$  (as a share on potential output) as:

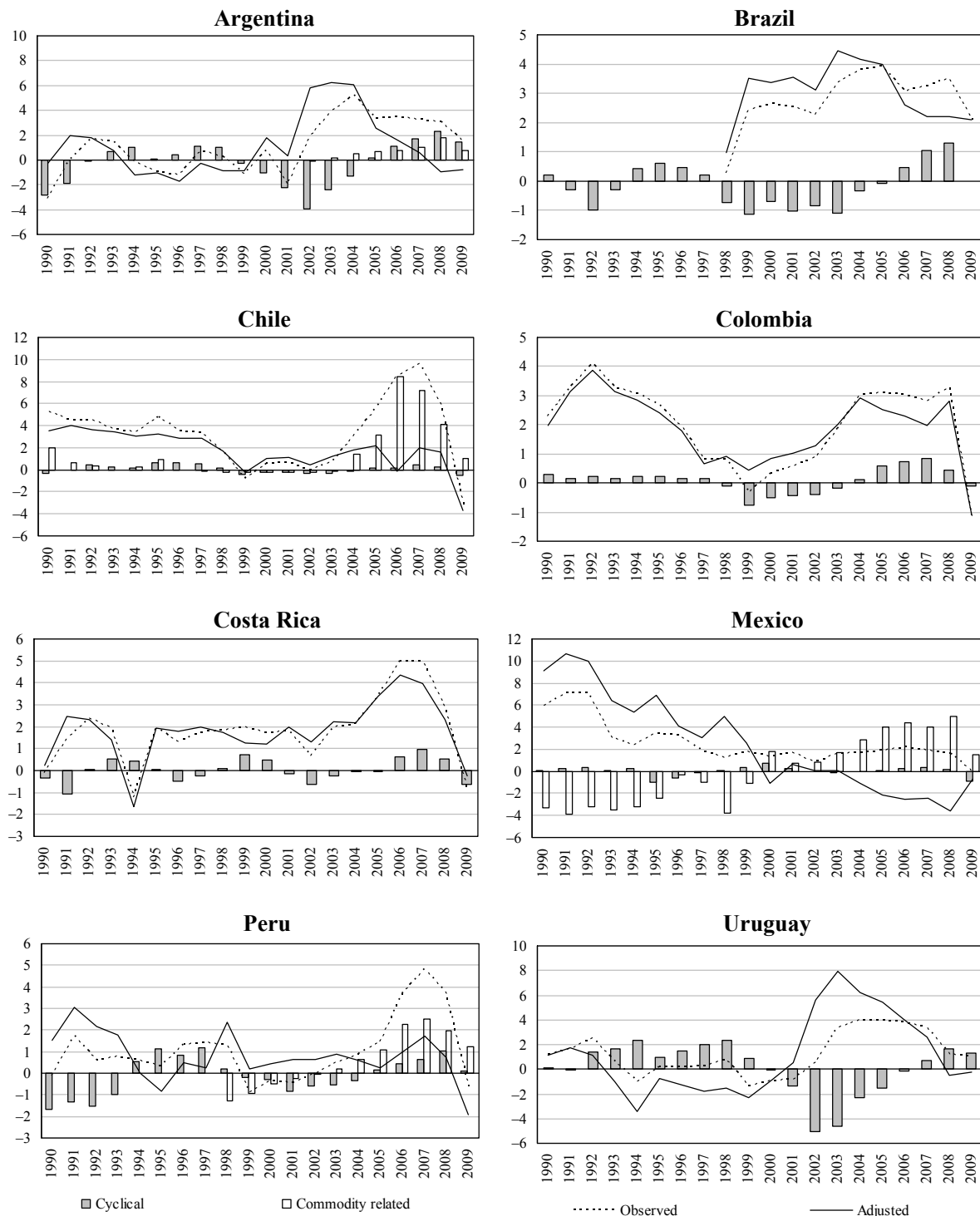
$$b^* = \frac{\left( \sum_{i=1}^4 T_i (Y^* / Y)^{\varepsilon_{i,y}} \right) - G + X}{Y^*} + R_c^s \quad (6)$$

where  $G$  are current primary government expenditures, the expression in parenthesis is the cyclically-adjusted receipts from taxes excluding those directly related to commodities,  $X$  are non-tax revenues not related to commodities minus capital and net interest spending,  $Y^*$  is the level of potential output, and  $R_c^s$  are the structural revenues related to commodities from equation (5).

Figure 10 shows the evolution of the primary budget balance (excluding interests) in the selected Latin American economies, the estimated impact of the economic cycle on revenues (automatic stabilization) with the price of commodities (for Argentina, Chile, Mexico and Peru), and the resulting “adjusted primary balance”.

Figure 10

### Adjusted Primary Budget Balance (percent of GDP)



Notes: Primary budget balance is adjusted for deviations of GDP and commodity prices (for Argentina, Chile, Mexico and Peru) around their trends, as explained in Sections 2.1 and 2.2. Non-financial public sector figures in Argentina, Colombia, Mexico and Uruguay, and general government figures for Brazil, Chile, Costa Rica and Peru, from ECLAC-ILPES and IDB databases.  
Source: Authors' calculations.

According to our estimates, at the onset of the crisis, adjusted primary balances were in equilibrium or surplus in a majority of countries (1 p.p. of GDP in Peru, 2 p.p. in Uruguay, 2.5 p.p. in Brazil, almost 3 p.p. in Chile and Colombia, and 5 p.p. in Costa Rica; -1.0 p.p. in Argentina and -3.6 p.p. in Mexico). So, even taking into account the positive economic and commodity price cycles, these figures confirm that the region faced the crisis in relatively good shape. The figure also highlights the significant impact of the economic cycle; especially in Argentina and Uruguay (automatic stabilizers via revenue

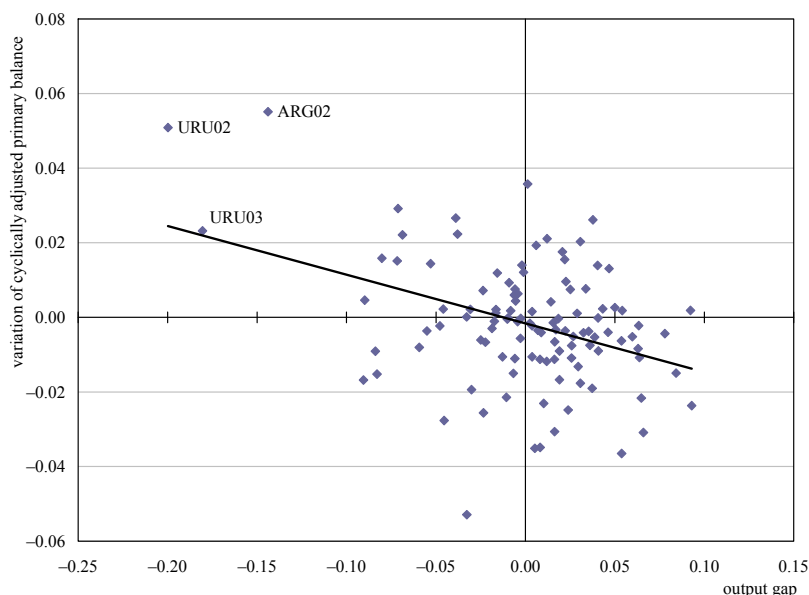
contributed more than 4 per cent of GDP to sustain aggregate demand). Finally, commodity prices (copper, gold and oil) contributed significantly to improve fiscal positions in latest years (around 1 p.p. in Argentina, 2 p.p. in Mexico, 3 p.p. in Peru and over 6 p.p. in Chile). Obviously, 2009 figures reflect a generalized deterioration, driven by cyclical, commodity related and discretionary factors.<sup>14</sup>

Next, we explore the pro-cyclicality of discretionary fiscal policy in the standard way, comparing the variation of the adjusted primary balance and the output gap level. Fiscal policy is defined as counter-cyclical if the surplus increases (deficit decreases) in a year with positive output gap, or if the deficit increases (surplus decreases) when the output gap is negative. As represented in Figure 11, in the last two decades discretionary fiscal policy in Latin America has tended to be pro-cyclical (the correlation coefficient is -0.37 and in more than 60 per cent of cases, 53 out of the 144 cases, discretionary fiscal policy was not stabilizing).

From a national perspective, no country has benefited from sustained countercyclical discretionary fiscal policy, and in all cases, countries show a majority of pro-cyclical fiscal impulses (the most favourable cases are Brazil and Mexico, with 46 and 47 per cent of stabilizing episodes, respectively). In spite of that, based on the correlations of the variation of the adjusted budget balance and output gap level, Chile shows to some extent a countercyclical pattern (0.35),

Figure 11

### Output Gap and Change in Adjusted Budget Balance (percent of GDP)



Source: Authors' calculations.

<sup>14</sup> 2009 budget figures are preliminary for many economies. Data for Argentina, Costa Rica, Colombia and Peru were taken from the respective Central Bank databases, for Mexico and Uruguay from Ministry of Finance databases, and Brazil and Chile from OECD *Economic Outlook* projections (May 2010). Access to stable funding (both internal and external) determined the size of announced fiscal packages in the region. Chile and Peru were the top performers in the "fiscal resilience index" constructed by the OECD (2009b); an index that takes into account the external debt to exports ratio (a standard fiscal solvency indicator), the financing cost of fiscal expansions (proxied by the JP Morgan's EMBI Global spreads), and the government's pre-crisis budget balance with respect to GDP. Not coincidentally, these two countries announced and implemented the biggest fiscal stimuli for 2009.

while in Colombia and Peru discretionary fiscal policy has been fairly neutral (coefficients of correlation of 0.01 and  $-0.07$  respectively). Argentina and Uruguay show the highest pro-cyclically, driven mainly by the impact and policy response to the 2002 crisis (if this episode is excluded, Uruguayan fiscal policy has been fairly neutral). Additionally, we find no clear progress in this field in the last decade. From 2000, fiscal policy has been more pro-cyclical ( $-0.49$  from 2000 vs.  $-0.22$  from 1990 to 1999) or as pro-cyclical at best ( $-0.18$  when controlling for the 2002 crisis). With these criteria, good practices stem again from Costa Rica, where discretionary fiscal policy has turned counter-cyclical, and Chile (where it was maintained throughout the period analysed).

We also test whether these results are symmetric along the economic cycle. Using this simplified approach, discretionary fiscal policy seems to be more pro-cyclical in the crisis, when output gap remains negative (correlation of  $-0.44$ ) than in booms ( $-0.15$ ). So, apparently, the pro-cyclicality of fiscal policy in the region is not explained by the existence of profligate governments, but with either internally or externally credit rationed countries, as dramatically shown in 2002 crisis, where a huge fiscal adjustment was implemented in a deep crisis environment in Argentina and Uruguay. Excluding this big shock, no significant difference remains between booms and (regular) busts, an issue that should be borne in mind when setting fiscal rules and institutions. Of course, if the fiscal authorities in the country are aware of the potential impact of such large negative shocks, one could still make the argument that it would be optimal to save more during the good times. However, when it comes to design fiscal rules, it is important to take into account that emerging markets might lose exogenously access to finance during times of turmoil.

While the main focus of this paper is on the cyclicity of fiscal policy in Latin America and the estimation of structural balances, the issue of fiscal sustainability has been of importance for the region, given its recurrent debt problems. Overall, in recent times there has been a reduction of debt-to-GDP levels in the region. However, there are considerable differences within the region. On the one hand, Chile, Costa Rica, Mexico (after the “tequila crisis”), and Peru reduced their debt-to-GDP levels over the last decade and more. Peru and Chile had debt levels of almost 80 per cent of GDP in the early 1990s, while nowadays exhibit levels around 25 per cent of GDP. Less pronounced, but still significant, has been the debt burden reductions in Costa Rica and Mexico from close to 50 per cent of GDP in the mid-1990s to less than 30 per cent in 2008. On the other hand, Argentina and Uruguay have suffered both a debt crisis during the collapse of their fixed exchange rate regimes and associated banking crises in 2001-02. Since then, in part due to debt restructuring, but also due to economic growth and fiscal surpluses they have reduced their debt levels down to around 50 per cent of GDP, which are higher levels than ten years ago. Brazil is closer to the case of Argentina and Uruguay, with still high levels of debt (at least in gross terms) and a somewhat slower reduction than the first group.

Debt sustainability depends on a series of factors such as long-term economic growth perspectives, the cost of funds (interest rate), and the composition of debt; but also things much harder to measure such as expectations (Calvo, 1988) and institutional/political characteristics affecting a country’s ability and willingness to service its sovereign debt. Furthermore, exogenous shocks to each of these variables are hard to identify, making debt sustainability analysis a challenging topic. Therefore, in this section we explore some aspects of debt dynamics in the region using standard techniques in the literature, rather than making a precise judgement regarding the need and size of fiscal adjustment in each country.

Although it is not obvious how to establish a benchmark for safe debt levels, one way to approach this issue is to compute the primary surplus required to stabilize debt-to-GDP ratios at their current level, and compare this required surplus with both actual and structural balances.

Given the government budget dynamics in equation (7), fiscal policy is considered

sustainable if the primary surplus ( $S$ ) is greater than the primary surplus required to stabilize the debt level ( $D$ ) relative to GDP ( $Y$ ):

$$D_{t+1} = (1 + r_{t+1})D_t - S_{t+1} \quad (7)$$

where debt levels are end-of-period and  $r_{t+1}$  is the average real interest rate during period  $t+1$ . Assuming that GDP ( $Y$ ) grows at a rate  $g_t$ , dividing equation (7) by  $Y_{t+1}$  yields:

$$d_{t+1} = \frac{1 + r_{t+1}}{1 + g_{t+1}} d_t - s_{t+1} \quad (8)$$

where all lower case variables refer now to GDP ratios.

Thus, for a given interest rate and GDP growth rate (assuming that they are constant over time), the primary surplus that stabilizes the current debt-to-GDP level is given by:

$$\bar{s} = \frac{r - g}{1 + r} \bar{d} \quad (9)$$

It should be recognised that this definition has some limitations. First, it does not say anything regarding the initial debt-to-GDP ratio, which might be too high and therefore an additional fiscal effort to reduce it to a safe level would be required. Second, this “accounting approach” does not consider underlying correlations and endogeneity of variables. For instance, in the presence of default risk, interest rates would increase with the debt burden and with net financing needs if liquidity risks are also present. Growth could in turn depend negatively on the cost of funding ( $r$ ) and the debt burden (if there is a debt overhang problem, where private investment is lower because economic agents incorporate the prospects of higher future taxes to service the debt).

In addition, valuation effects can have very important quantitative effects, as most countries in the region have painfully learnt during the 1980s and 1990s (debt dollarization). In particular, swings in the real exchange rate often imply large fluctuations in the debt-to-GDP ratio, if the fraction of dollarized debt is different from the share of tradable goods in GDP.<sup>15</sup> Observe that the steady-state debt-to-GDP ratio can be written as:

$$\bar{d} = \frac{B + eD^*}{Y} \quad (10)$$

where  $e$  is the relative price of tradable goods in terms of one unit of output,  $D^*$  is debt denominated in tradables (dollars) and  $B$  in output units. The right-hand-side of equation (10) can be written as:

$$\frac{B}{Y} + \phi \frac{D}{Y} \quad (11)$$

with  $\phi = \frac{eD^*}{D}$  representing the share of foreign-currency denominated debt.

The valuation-corrected debt-to-GDP ratio for a given equilibrium exchange rate  $\tilde{e}$  is:

$$\tilde{d} = \frac{B}{Y} + \tilde{\phi} \tilde{d} \quad (12)$$

<sup>15</sup> In addition, the remaining fraction of debt in general is often not nominal debt, but indexed to CPI inflation or short-term interest rates, which move often in tandem with the exchange rate.

where  $\tilde{\phi} = \frac{\tilde{e}D^*}{D}$ .

Thus, under an appreciated real exchange rate ( $e < \tilde{e}$ ), the valuation-corrected debt ratio will be greater than the observed ratio. This implies that the required primary surplus, shown in equation (13), will also be higher, given that a depreciation of the currency *vis-à-vis* the dollar would be expected in the transition to the steady state. Vice versa, if the currency is depreciated (above the equilibrium exchange rate), the adjusted debt level will be less than the observed one.

$$\tilde{s} = \frac{r-g}{1+r} \tilde{d} \quad (13)$$

In practical terms, we measure the equilibrium real exchange rate to be measured by the average bilateral real exchange rate *vis-à-vis* the US dollar, considering CPI prices over the period 1990-2008. Furthermore, as proxy for the share of foreign currency debt in total debt, we use data on the markets where debt was issued, assuming that all external debt is in US dollars and all domestic debt is indexed to the domestic price level (which we assume to equal the GDP deflator; this is the implicit assumption in equations 11-13).

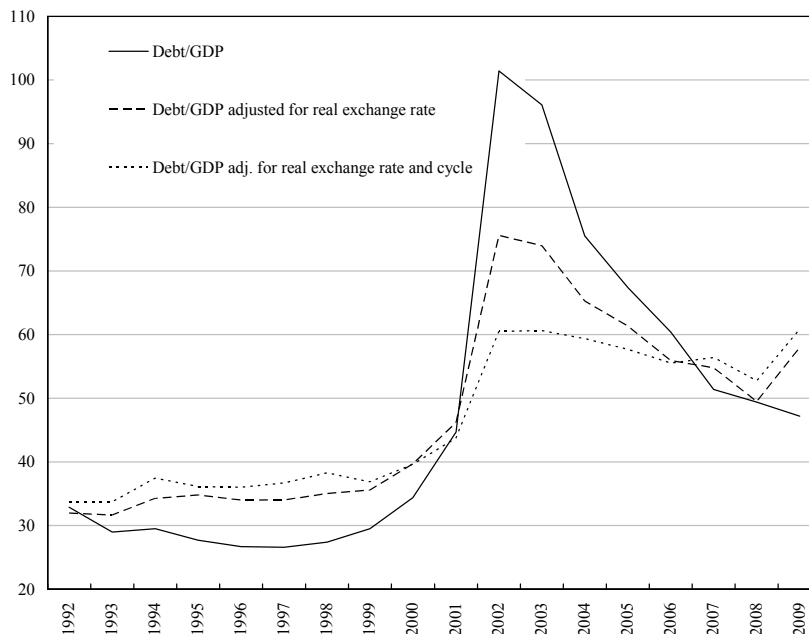
A final adjustment refers to point in the cycle at which GDP stands, given that the debt-to-GDP ratio would be lower during a boom (holding constant the stock of debt), such that our preferred measure of sustainability is given by:

$$\hat{s} = \frac{r-g}{1+r} \tilde{d} \frac{Y}{Y^*} \quad (14)$$

where  $Y^*$  is potential output. In practical terms, we compute potential output jointly with the business cycle using the structural time series approach described below.

**Figure 12**

**Debt Dynamics and the Real Exchange Rate in Uruguay**  
(percent of GDP)



Source: Authors' calculations based on ECLAC-ILPES database.

Before computing the required fiscal surpluses, it is useful to explore the relevance of these adjustments. Figure 12 shows the potential importance of these adjustments from a quantitative point of view for the case of Uruguay. Debt levels as a ratio of GDP in the late 1990s were slightly below 30 per cent of GDP. However, when taking into account the appreciation of the real exchange rate with respect to its

Table 5

**Debt Sustainability Analysis**  
(percent of GDP)

Country	Adjusted Primary Balance (2009)	Observed Primary Balance (2000-09)	Required Surplus (Baseline)	Required Surplus (IMF Forecasts)
Argentina	-0.8	2.1	3.1	3.5
Brazil	2.0	3.0	1.3	1.0
Chile	-3.7	2.8	0.1	0.0
Colombia	-1.1	1.6	0.5	0.3
Costa Rica	-0.2	2.3	0.8	0.4
Mexico	-0.7	1.5	1.2	0.4
Peru	-1.9	1.2	-0.1	-0.1
Uruguay	-0.2	1.6	0.9	1.2

Notes: Required surplus corresponds to equation (14) with debt-to-GDP ratios adjusted by the real exchange rate and the business cycle. Observed primary balance is the average of observed fiscal balances as percentage of GDP over the last ten years. IMF forecasts refer to the WEO April 2010 forecast of real GDP growth in 2015.

Source: Authors' calculations.

long-term average, debt levels would have been ten percentage points of GDP higher. The opposite is true for 2002, where the observed debt-to-GDP ratio shot up to over 100 per cent of GDP, while it would have been around 76 per cent of GDP if debt was valued at the long-term real exchange rate, and almost 16 per cent of GDP less if it were taken into account that the Uruguayan economy was in a deep crisis with GDP far below its potential (almost 20 per cent, according to our estimates). Finally, regarding the large reduction in the debt-to-GDP ratio after the crisis of more than 50 percentage points of GDP between 2002 and 2009, our structural measure of debt was reduced by 7.7 percentage points until 2008, but increased in 2009 to reach similar levels as in 2002. Thus, most of the reduction in the debt-to-GDP ratio could be attributed to the rebound in economic growth and the appreciation of the real exchange rate in the aftermath of the devaluation of the currency.

The main results for the eight countries for 2009 are reported in Table 5.<sup>16</sup> As discussed above, in 2009, most countries present a considerably lower structural balance in 2009 than in previous years, given the automatic and discretionary fiscal expansion in response to the economic crisis. However, all countries (except Argentina) have been able during the last decade to exhibit fiscal balances above those required to sustain their current debt levels, such that they could be expected to reverse expansionary policies without major difficulties. In terms of the difference between the adjusted balance and the required balance to keep debt levels at their current values, while Brazil is the only country with a structural balance above the required surplus, for several countries the difference is below two percent (Costa Rica, Uruguay, Colombia, Mexico and Peru).

Argentina and Chile are the exceptions, with a difference of 3.9 and 3.7 per cent of GDP,

<sup>16</sup> For each country we considered the current yields (average 2010) on sovereign debt bonds (JP Morgan's EMBIG) as the relevant interest rate. Observed and trend growth rates in 2009 are estimated according to the methodology explained in Section 3.

respectively. However, Argentina and Chile are in very different situations. First, Chile took discretionary measures with a fiscal impulse of around 5.6 per cent of GDP (comparing 2007 with 2009), while the impulse in Argentina was much smaller (1.3 per cent of GDP). Thus, countercyclical fiscal policy was much stronger in Chile than Argentina. This impulse was taken from a very strong position (debt-to-GDP of only around 6 per cent of GDP) in Chile, which is also reflected in the low fiscal surplus required to balance debt levels at their current value; meanwhile Argentina requires a much higher fiscal primary surplus (and has higher levels of debt, 47.1 per cent of GDP, adjusting for the real exchange rate and the business cycle). In more general terms, the level of the structural balances (as well as the fiscal impulse during 2007-09) is highly correlated with the initial debt position. Countries with higher levels of debt were in a more solid position to have higher structural deficits and larger fiscal impulses (the correlation coefficients with the debt levels are 0.90 and 0.48, respectively).

### 3 Estimation of output gap

Many researchers have recognised and analysed aggregate cycles in production without reaching consensus on its causes.<sup>17</sup> Lack of consensus regarding the theory is accompanied by an empirical problem; measurement of economic cycles depends on the estimation of potential output, which is unobservable. OECD methodology decomposes production through classical Solow factor decomposition of capital constructed through perpetual inventory methods, labour (hours worked) and multifactor productivity (MFP). Potential output is then constructed as the counter-factual production arising from full capital utilization,<sup>18</sup> unemployment rate equal to the NAIRU, and MFP given by its long-run trend.

Although we follow the above criteria to construct potential output in the Latin American countries, we could not follow OECD methodology by further disaggregating factors by their specific types, by the sectors of the economy where they are being used, or by their rate of utilization. In particular, restrictions on data availability for several Latin American countries forced us to construct capital from aggregate investment figures, using the perpetual inventory method with infinite lifespan and a constant depreciation rate of eight percent. Real investment, real GDP and active population data are chained series<sup>19</sup> built from series in *Penn World* tables, which cover a span of nearly six decades, from 1950 to 2007. The series are extended up to 2013 using IMF's World Economic Outlook estimates and forecast as of April 2010.<sup>20</sup> The treatment of net exports, in real terms (volume) or in terms of its purchasing power (dollars), merits also some attention. While the first measure better reflects production dynamics, the latter better reflects change on income. We opt for the former measure of volume on two grounds: we keep consistency when we later decompose GDP using a production function, and we analyze the effect of terms of trade on fiscal balance separately from the effect of the business cycle. Initial capital stock in 1950 is assumed to be on a balanced growth path, thus approximated by:

$$K_{1950} = I_{1950} / [(1 + g)(1 + n) - (1 - \delta)] \quad (15)$$

where  $I_{1950}$  is initial investment expenditure (filtered by a linear interpolation of the log investment

<sup>17</sup> This has lead economist to declare such aggregate behaviour dead in more than one occasion. The latest notable quote came in 2003 from Robert Lucas, who in his presidential address to the *American Economic Association* declared that "the central problem of depression-prevention has been solved, for all practical purposes, and has in fact been solved for many decades".

<sup>18</sup> OECD latest revision to potential output uses total capital rather than a filtered series of such series (OECD, 2008).

<sup>19</sup> See OECD (2001) for the benefit of chained indices with respect to other bases of conversion, especially when looking at higher frequency data and avoiding level comparison across countries.

<sup>20</sup> Potential output is estimated up to 2009. But forecasts for years 2010 onwards are used as a way to circumvent well-known end point filter problems when estimating trends. GDP forecasts are provided by the IMF, while investment forecasts are estimated from those GDP forecasts, using simple regression of investment growth on GDP growth between 1990 and 2009.



throughout the 1950s),  $g$  is the average rate of technological progress on that same decade, and  $n$  is the corresponding average growth rate of active population.

For the implicit Cobb-Douglas production function we assume a capital share of 0.5 for all countries. This is significantly different from the standard approximation of one third, but closer to the average obtained in the literature that covers emerging markets (see, for example, Gollin, 2002, for country-specific measures of this parameter for a wide range of countries).

Given the broad level of aggregation, cyclical action will be centred in MFP. Several statistical studies have questioned the usual Hodrick-Prescott methodology to de-trend economic series, arguing that it is tailor-made for the output cycles in the US, but not necessarily optimal for any other type of economic series (see Harvey *et al.*, 2008). Furthermore, there is ample evidence that emerging markets have a very different cyclical behaviour than industrialized economies, with some authors putting into question even the existence of cyclical shocks (e.g., Aguiar and Gopinath, 2007).

To address some of these challenges posed in the literature, we de-trend the resulting MFP series using the unobserved components model suggested by Harvey (1998). We use this state-space estimation method to estimate unexpected shocks to the MFP series, decomposing these shocks into three components: shocks that have a permanent effect on MFP, cyclical shocks with an estimated frequency, and time decay, and transitory “white noise” shocks. Permanent shocks determine the trend while the two latter shocks determine the gap to potential output. Harvey (1989) shows that the Hodrick-Prescott filter can be obtained as a particular case of this method, by imposing two additional restrictions: no cyclical component and a predetermined ratio between the variance of transitory and permanent shocks (a ratio that coincides with the parameter lambda of HP filters).

We define the logarithm of multifactor productivity  $a$ , and use the state-space domain to decompose the series into three unobserved components: a trend  $t$ , a cycle  $c$ , and a transitory shock  $\xi_t$ :

$$a = t + c + \xi_t \quad (16)$$

The trend component accounts for permanent changes in the growth rate of (log) MFP, and is thus interpreted as the “long run trend for multi factor productivity” in potential output. It is specified as growing with a stochastic drift  $\mu$ :

$$t = t_{-1} + \gamma \Delta_{\text{crisis}} + \mu \quad (17)$$

where  $t_{-1}$  is the trend in the previous period and  $\Delta_{\text{crisis}}$  is a year dummy that account for large permanent MFP losses at the beginning of the 1980s debt crisis. The drift rate  $\mu$  is assumed to follow a random walk:

$$\mu = \mu_{-1} + \beta \Delta_{\text{crisis}} + \xi_\mu \quad (18)$$

where the same 1980s dummy  $\Delta_{\text{crisis}}$  is used to account for any large permanent reduction in MFP's growth rates after the debt crisis. Thus, MFP trend grows at a rate that varies, but that at any time  $t$ , is best forecasted as remaining constant and equal to current rate  $\mu$ . The large recession in the early 1980s and the prolonged low growth that resulted call for adding the  $\Delta_{\text{crisis}}$  dummy, which proves to be significantly negative for both the level and rate of MFP trend. As countries felt the 1980s recession in different years (between 1981 and 1982), for each country we select the year dummy which maximizes the log likelihood (following the AIC criteria).

The cycle component  $c$  follows the autoregressive process:

$$c = \rho \cos(\lambda) c_{-1} + \rho \sin(\lambda) c_{-1}^* + \xi_c \quad (19)$$

$$c^* = -\rho \sin(\lambda) c_{-1} + \rho \cos(\lambda) c_{-1}^* + \xi_{\chi}^* \quad (20)$$

where  $\xi_{\chi}$  and  $\xi_{\chi}^*$  are disturbances with equal variance. The period of the cycle is  $2\pi/\lambda$ . The damping factor  $\rho$  with  $0 < \rho < 1$  ensures that  $c$  is a stationary ARMA (2, 1) process with complex roots in the autoregressive part. It is assumed that all disturbances are normally distributed and are independent of each other (usual assumption to assure the identification of the parameters). Initial values for the stationary cycle components are given by the unconditional distribution and for the non-stationary trend and drift components by a diffuse prior. The filtered and smoothed values of the unobserved components are generated by the Kalman filter.

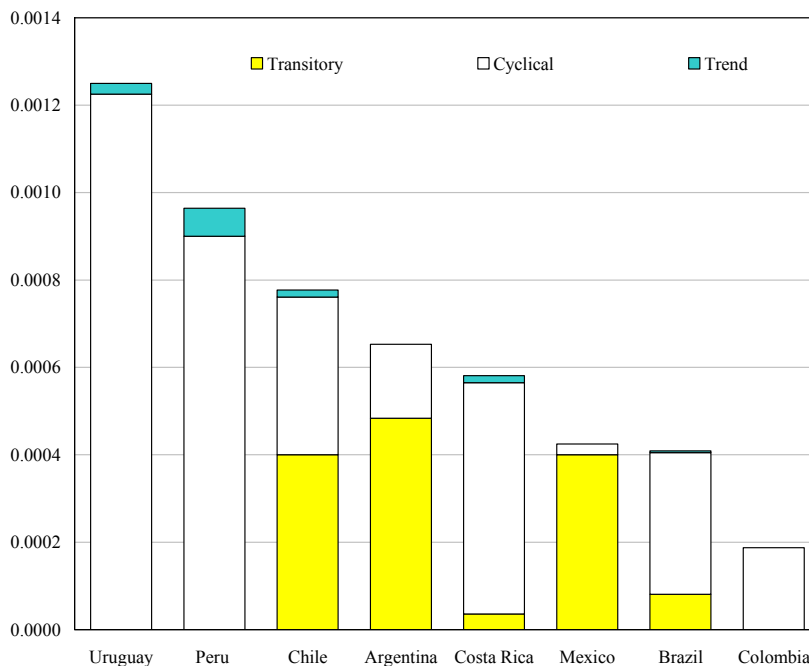
Estimated parameters for the temporary, cyclical and trend components vary significantly across countries. Figure 13 shows the variance decomposition of unexpected shocks in each period ( $\xi_u + \xi_{\chi} + \xi_t$ ). While Uruguay has the largest estimated total variance, its shocks are mostly cyclical. The figure also shows that long term estimated shocks to the trend in Chile, Costa Rica, Peru and Uruguay have a statistically significant variance. As expected, even for these countries, this variance is significantly smaller than the estimated variance of the two stationary shocks; a fact that translates into a relatively smooth long-term trend. Though smaller in size than the stationary shocks, trend shocks follow a random walk. Thus their effect is cumulative and large after several periods.

For this reason, while estimated trends in Argentina, Brazil and Uruguay are close to (but different than) zero, growth rate of MFP, together with changes in capital formation, may accumulate and cause significant changes on long run GDP (as observed in Figure 14).

Table 6 shows the estimated damping factor  $\rho$  and the estimated period  $2\pi/\lambda$  for the stochastic cycle component. Uruguay shows the longest stochastic cycles (averaging 15 years)

**Figure 13**

**Estimated Variance Decomposition of Shocks to Log MFP**

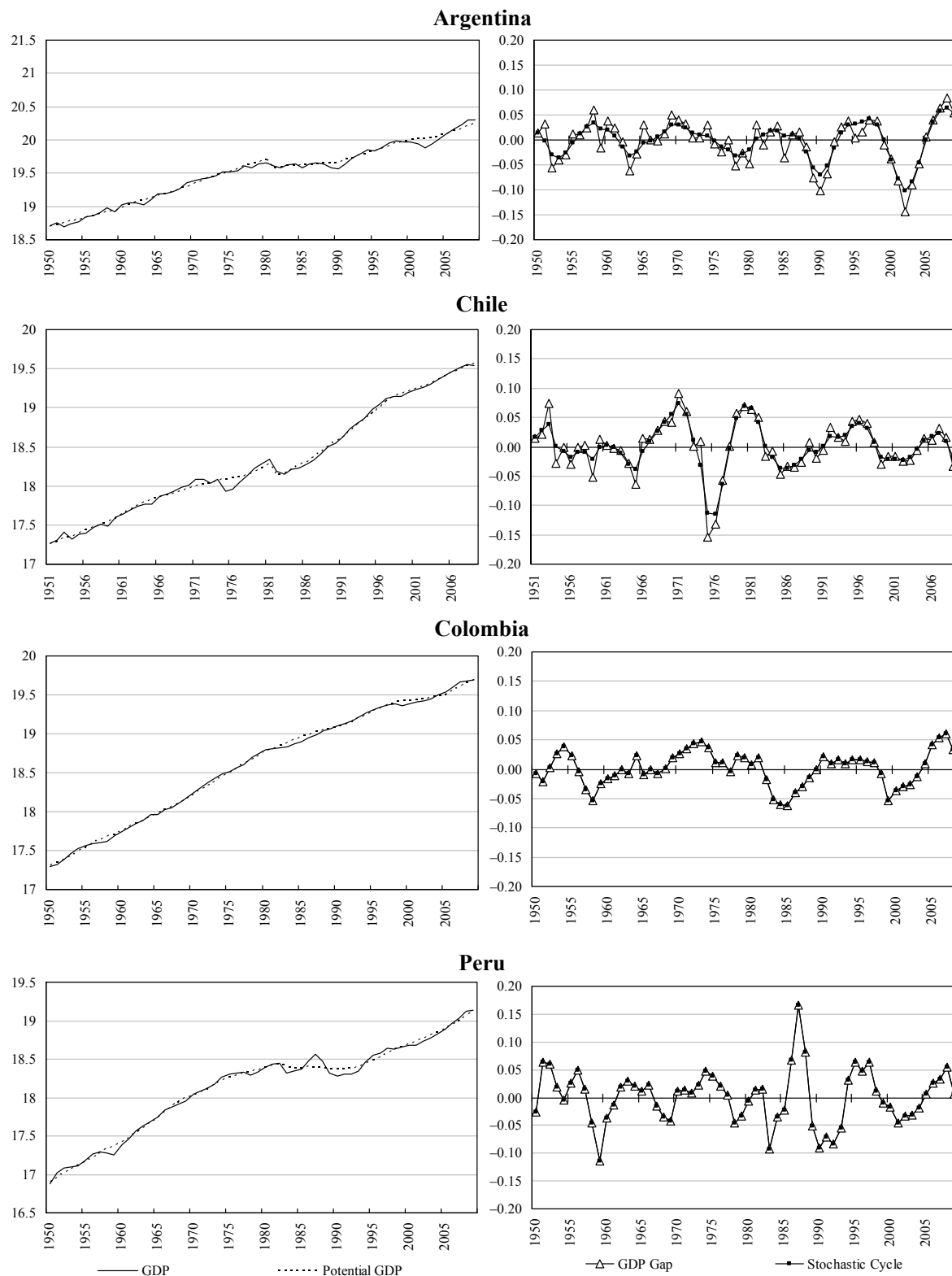


Source: Author's calculations.

while Mexico and Peru show the shortest cycles (averaging 9 years). Brazil's estimated cycles are the closest to the "biblical cycle" of 14 years. The damping factor for Costa Rica is the strongest with  $\rho$  equal to 0.24 (*i.e.*, the cyclical shock is dampened to a fourth of its size by the following year), while Mexico exhibits the weakest dampening effect with an estimated  $\rho$  equal to 0.93 (*i.e.*, it takes 19 years for the cyclical shock to be dampened to a fourth of its size). In Mexico, the high estimated value of  $\rho$ , combined with the low estimated variance of cyclical shocks, implies a very stable "almost non-stochastic" cycle.

Figure 14

## Evolution of Estimated Trend and Cycles for Argentina, Chile, Colombia and Peru



Source: Author's calculations.

#### 4 Conclusions and policy implications

This paper aims to contribute to the debate on fiscal policy in Latin America by measuring cyclicalities of fiscal balances using a common methodology. At the onset of the international financial crisis in 2008-09, many indicators suggested that Latin American economies were facing the crisis in a much better macroeconomic position than in the past; with positive

budget surpluses, lower debt-to-GDP levels and a more credible monetary policy thanks to inflation targeting regimes. Solid macro balances were the new reality in a region where fiscal fragility had been at the root of past protracted crises, such as the dramatic debt crisis of the 1980s.

We track fiscal balances since the early-Nineties for a set of Latin American economies, implementing both standardised cyclical-adjustment OECD methodology and regional specific adjustments for the impact of commodity prices. These estimations allow measuring the size of automatic stabilisers embedded in tax policies, and the cyclicalities of discretionary fiscal policy in the region as a whole. Additionally, we perform debt sustainability exercises to analyse how far from a potential benchmark current fiscal balances are.

Our main messages can be summarized as follow. First, there is a great degree of uncertainty concerning output gap estimates in Latin America. Compounded with highly volatile cyclical shocks, there is evidence of highly volatile trends for potential output. Second, commodity cycles may be as relevant to countercyclical policy as economic cycles, because of the former's significance in total fiscal revenues. Third, tax automatic stabilizers are significant, although fairly small. Primary budget balances respond automatically around 0.2 per cent for each percentage point of output gap in the region, half the OECD average (although with significant regional differences). Forth, since the early-Nineties, discretionary fiscal policy has been pro-cyclical in Argentina, Brazil, Costa Rica, Mexico and Uruguay, while neutral in Chile, Colombia and Peru. Fifth, pro-cyclicalities of discretionary fiscal policy is probably explained by lack of access to credit during deep crises, rather than by profligate spending. And sixth, from a structural perspective, both cyclically-adjusted balances and debt sustainability analysis confirm the better position enjoyed by most countries in the region before the crisis.

Venues for continuing research include lifting restrictions and understanding the implications of distinguishing cyclical and trend volatility. In a first stage, some hard assumptions we made to apply the OECD methodology may be relaxed, in particular the unitary elasticity of consumption taxes to the cycle, and the consideration of automatic stabilization via expenditure. Additionally, alternative data sources of the distribution of tax payers (administrative data) may be used as a robustness check of the results. Finally, it would be interesting to identify in the tax revenues series the effects of tax and social security reforms implemented since 1990, and to estimate their impact on elasticities.

Table 6

Estimated Parameters for Cyclical Shocks

Country	Period	$\rho$
Argentina	11.4	0.84
Brazil	14.1	0.66
Chile	11.6	0.77
Colombia	14.3	0.74
Costa Rica	12.8	0.24
Mexico	8.6	0.93
Uruguay	15.3	0.72
Peru	8.9	0.67

Source: Author's calculations.

# ANNEX 1

## OUTPUT GAP AND WAGES

Table 7

### Regressions of Income Growth to Growth of Output Gap

Country	sW	Coeff.	Std. Err.	<i>t</i>	<i>P</i> >  <i>t</i>	(95% Conf. Interval)	
Argentina	sGap	1.052835	0.3538535	2.98	0.006	0.32406011	0.78161
	cons	−0.0010282	0.0146514	−0.07	0.945	−0.0312034	0.029147
Chile	sGap	0.696172	0.2313957	3.01	0.006	0.2196036	1.17274
	cons	−0.0014225	0.0055165	−0.26	0.799	−0.0127839	0.0099388
Costa Rica	sGap	1.729863	0.3118525	5.55	0.000	1.087591	2.372136
	cons	−0.0016511	0.0082065	−0.20	0.842	−0.0185527	0.0152505
Mexico	sGap	1.452921	0.3424351	4.24	0.000	0.7476625	2.158179
	cons	0.002872	0.0117638	0.24	0.809	−0.0213559	0.0270999
Peru	sGap	1.954151	0.4909695	3.98	0.001	0.9429808	2.965322
	cons	−0.01838	0.0258092	−0.71	0.483	−0.0715351	0.034775
Uruguay	sGap	0.8907144	0.2280803	3.91	0.001	0.4209743	1.360454
	cons	−0.0116578	0.012358	−0.94	0.355	−0.0371096	0.013794

**Results of Unobserved Components Model Estimation for Potential Multi Factor Productivity****Argentina**

Sample: 1950-2007

Number of obs = 58

Log likelihood = 105.73313

log MFP	Coeff.	Std. Err.	$z$	$P> z $	(95% Conf. Interval)	
$\gamma_{1981}$	-0.1532983	0.0204885	-7.48	0.000	-0.193455	-0.1131416
$\beta_{1981}$	-0.0011573	0.0011727	-0.99	0.324	-0.0034557	0.0011411
S.E. of $\xi_\mu$	$5.45e^{-10}$	0.0002444	0.00	1.000	-0.0004791	0.0004791
$\rho \cos(\lambda)$	0.7885919	$9.55e^{-06}$	$8.3e^{+04}$	0.000	0.7885732	0.7886106
$\rho \sin(\lambda)$	-0.4852602	$4.16e^{-06}$	$-1.2e^{+05}$	0.000	-0.4852683	-0.485252
S.E. of $\xi_\chi$	0.013292	0.0032897	4.04	0.000	0.0068444	0.0197397
S.E. of $\xi_t$	-0.0221279	0.0035741	-6.19	0.000	-0.029133	-0.0151228

**Brazil**

Sample: 1950-2007

Number of obs = 58

Log likelihood = 118.84452

log MFP	Coeff.	Std. Err.	$z$	$P> z $	(95% Conf. Interval)	
$\gamma_{1981}$	-0.1207987	0.0291704	-4.14	0.000	-0.1779716	-0.0636257
$\beta_{1981}$	-0.0231028	0.0098635	-2.34	0.019	-0.042435	-0.0037707
S.E. of $\xi_\mu$	0.0026364	0.0014108	1.87	0.062	-0.0001286	0.0054014
$\rho \cos(\lambda)$	0.7330813	$4.68e^{-06}$	$1.6e^{+05}$	0.000	0.7330721	0.7330905
$\rho \sin(\lambda)$	0.3568044	$1.44e^{-06}$	$2.5e^{+05}$	0.000	0.3568015	0.3568072
S.E. of $\xi_\chi$	0.0181422	0.0035965	5.04	0.000	0.0110932	0.0251912
S.E. of $\xi_t$	-0.0090068	0.0044601	-2.02	0.043	-0.0177485	-0.0002651

**Chile**

Sample: 1950-2007

Number of obs = 57

Log likelihood = 93.5357

log MFP	Coeff.	Std. Err.	$z$	$P> z $	(95% Conf. Interval)	
$\gamma_{1982}$	-0.1585976	0.0411957	-3.85	0.000	-0.2393397	-0.0778556
$\beta_{1982}$	0.06319	0.0140235	1.47	0.141	-0.0068536	0.0481175
S.E. of $\xi_{\mu}$	0.0042634	0.0017336	2.46	0.014	0.0008655	0.0076612
$\rho \cos(\lambda)$	0.7542281	$2.89\text{e}^{-06}$	$2.6\text{e}^{+05}$	0.000	0.7542225	0.7542338
$\rho \sin(\lambda)$	0.4502893	$1.72\text{e}^{-06}$	$2.6\text{e}^{+05}$	0.000	0.4502859	0.4502927
S.E. of $\xi_{\chi}$	0.0193095	0.0041932	4.60	0.000	0.011091	0.0275281
S.E. of $\xi_t$	0.0203625	0.0039529	5.15	0.000	0.0126149	0.0281101

**Colombia**

Sample: 1950-2007

Number of obs = 58

Log likelihood = 168.231

log MFP	Coeff.	Std. Err.	$z$	$P> z $	(95% Conf. Interval)	
$\gamma_{1982}$	-0.0589079	0.0163315	-3.61	0.000	-0.090917	-0.0268988
$\beta_{1982}$	-0.0202486	0.0009121	-22.20	0.000	-0.0220363	-0.0184609
S.E. of $\xi_{\mu}$	$3.78\text{e}^{-11}$	0.0001884	0.00	1.000	-0.0003692	0.0003692
$\rho \cos(\lambda)$	0.7802297	0.052166	14.96	0.000	0.6779863	0.8824731
$\rho \sin(\lambda)$	0.3666441	0.0603868	6.07	0.000	0.2482882	0.4850001
S.E. of $\xi_{\chi}$	-0.0137002	0.0012958	-10.57	0.000	-0.0162398	-0.0111605
S.E. of $\xi_t$	$-6.98\text{e}^{-10}$	0.0067861	-0.00	1.000	-0.0133004	0.0133004

**Mexico**

Sample: 1950-2007

Number of obs = 58

Log likelihood = 123.58014

log MFP	Coeff.	Std. Err.	z	P> z	(95% Conf. Interval)	
$\gamma_{1982}$	-0.1558083	0.0115221	-13.52	0.000	-0.1783912	-0.1332254
$\beta_{1982}$	-0.0150606	0.0007016	-21.46	0.000	-0.0164358	-0.0136854
S.E. of $\xi_u$	$9.95e^{-12}$	0.0001558	0.00	1.000	-0.0003054	0.0003054
$\rho \cos(\lambda)$	0.7152843	$2.40e^{-06}$	$3.0e^{+05}$	0.000	0.7152796	0.715289
$\rho \sin(\lambda)$	0.6461949	$4.06e^{-06}$	$1.6e^{+05}$	0.000	0.6462028	0.6461869
S.E. of $\xi_x$	0.0047896	0.0015288	3.13	0.002	0.0077859	0.0017933
S.E. of $\xi_t$	-0.019532	0.002262	-8.63	0.000	-0.0239654	-0.0150986

**Peru**

Sample: 1950-2007

Number of obs = 58

Log likelihood = 89.85937

log MFP	Coeff.	Std. Err.	z	P> z	(95% Conf. Interval)	
$\gamma_{1981}$	-0.0245013	0.0455782	-0.54	0.591	-0.1138329	0.0648302
$\beta_{1981}$	-0.0336053	0.0225792	-1.49	0.137	-0.0778597	0.0106492
S.E. of $\xi_u$	0.0076486	0.002554	2.99	0.003	0.0026427	0.0126544
$\rho \cos(\lambda)$	0.6275314	$2.78e^{-06}$	$2.3e^{+05}$	0.000	0.6275259	0.6275368
$\rho \sin(\lambda)$	0.5331292	$2.36e^{-06}$	$2.3e^{+05}$	0.000	0.5331246	0.5331338
S.E. of $\xi_x$	0.0298896	0.0030726	9.73	0.000	0.0359118	0.0238673
S.E. of $\xi_t$	$2.89e^{-32}$	0.0116013	0.00	1.000	-0.0227381	0.0227381



**Uruguay**

Sample: 1950-2007

Number of obs = 58

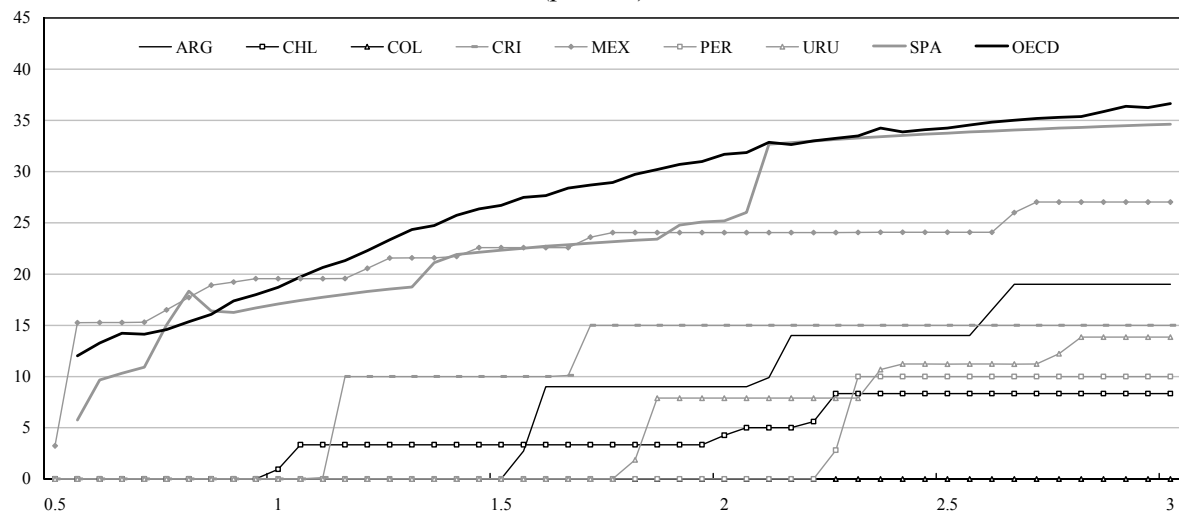
Log likelihood = 89.822777

log MFP	Coeff.	Std. Err.	$z$	$P> z $	(95% Conf. Interval)	
$\gamma_{1982}$	-0.0956271	0.0450603	-2.12	0.034	-0.1839436	-0.0073105
$\beta_{1982}$	0.0032569	0.0192269	0.17	0.865	-0.0344272	0.040941
S.E. of $\xi_\mu$	0.0052465	0.0025954	2.02	0.043	0.0001596	0.0103334
$\rho \cos(\lambda)$	0.7841392	$3.36e^{-06}$	$2.3e^{+05}$	0.000	0.7841326	0.7841458
$\rho \sin(\lambda)$	0.3442606	$2.25e^{-06}$	$1.5e^{+05}$	0.000	0.3442562	0.344265
S.E. of $\xi_\chi$	0.0352872	0.0035362	9.98	0.000	0.0283563	0.0422181
S.E. of $\xi_i$	$2.72e^{-07}$	0.0103452	0.00	1.000	-0.020276	0.0202765

## ANNEX 2 TAX RATES

Figure 16

### Marginal Personal Income Tax by Income Levels (percent)



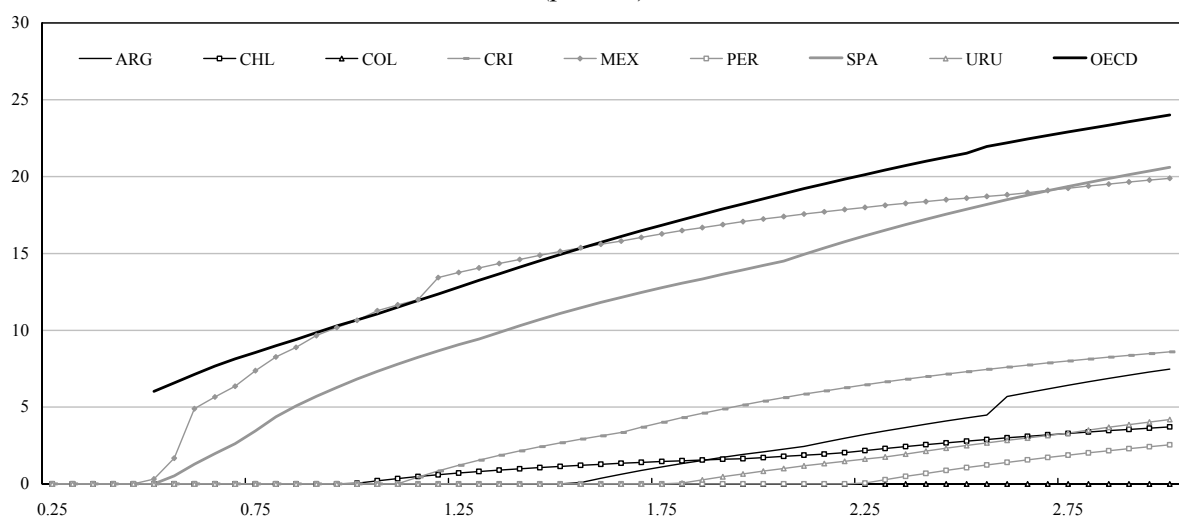
Note: Marginal tax rate by household labour income level.

1 represents the national average. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations based on OECD's *Taxing Wages* (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

Figure 17

### Average Personal Income Tax by Income Levels (percent)

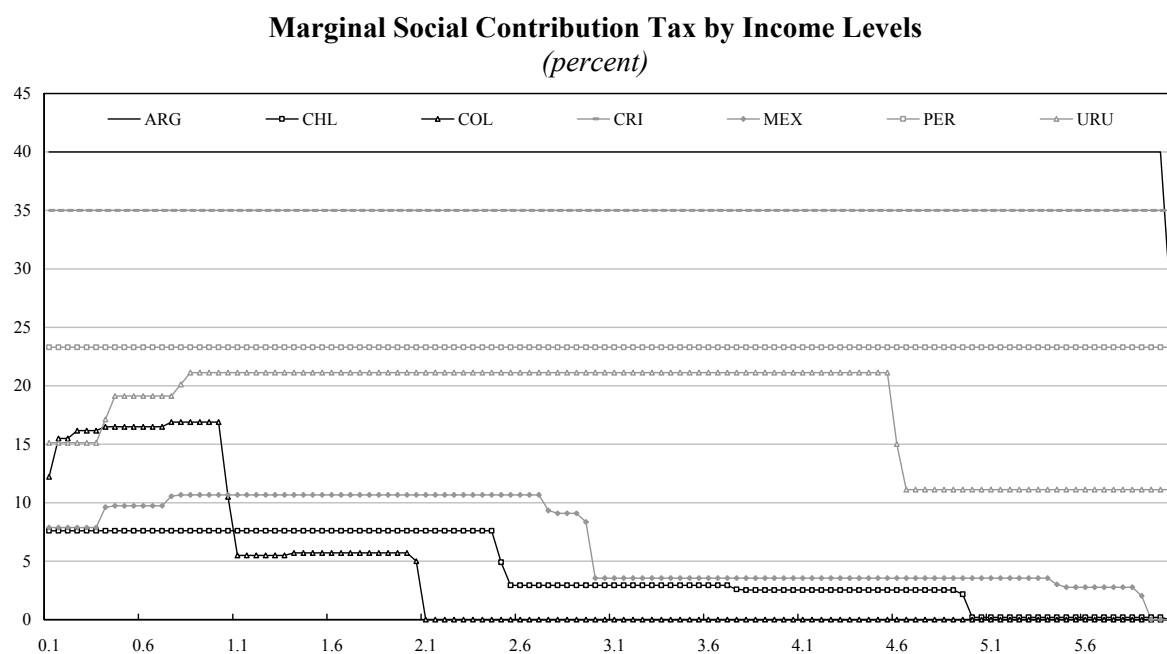


Note: Average tax rate by household labour income level.

1 represents the national average. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations based on OECD's *Taxing Wages* (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

Figure 18

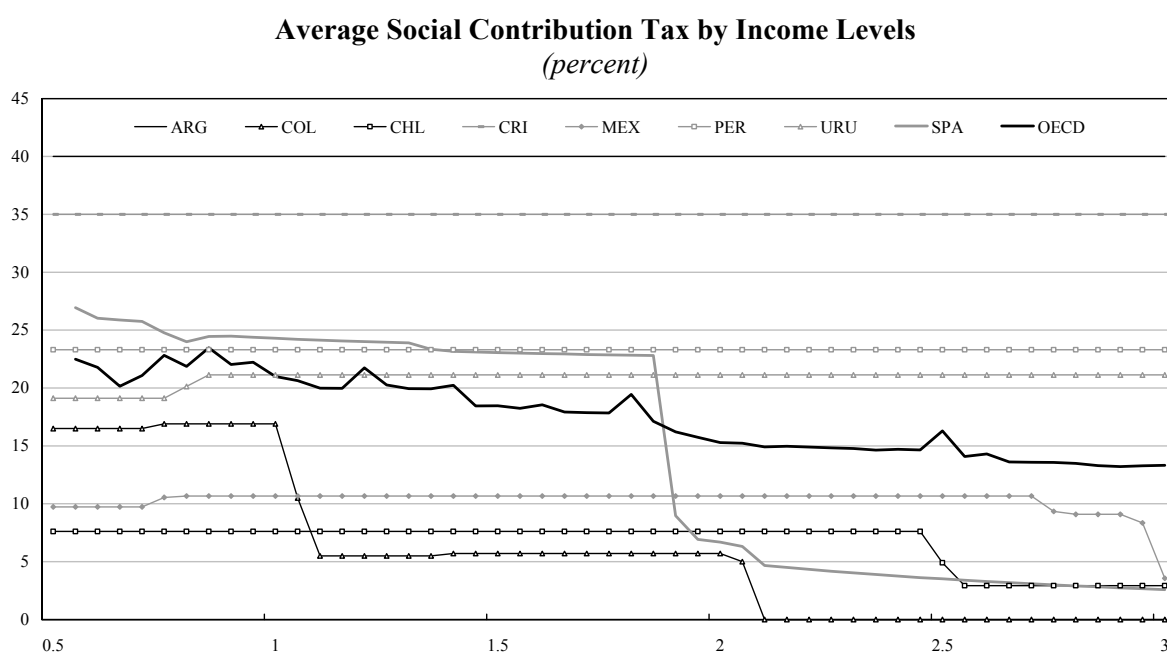


Note: Marginal tax rate by household labour income level.

1 represents the national average.

Source: Authors' calculations based on OECD's *Taxing Wages* (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

Figure 19



Note: Average tax rate by household labour income level.

1 represents the national average. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations based on OECD's *Taxing Wages* (Mexico), Ministries of Finance (Chile and Uruguay) and own elaboration (Argentina, Colombia, Costa Rica and Peru).

Table 8

**General Government Revenues**  
(percent of GDP)

Country	Tax					Current Primary Revenue	
	Corporate	Personal	Indirect	Social Security	Total	Non-tax Revenue	Total
<b>Argentina</b>	<b>3.5</b>	<b>1.5</b>	<b>11.6</b>	<b>3.8</b>	<b>20.4</b>	<b>2.8</b>	<b>23.2</b>
<b>Brazil</b>	<b>3.4</b>	<b>0.3</b>	<b>14.2</b>	<b>8.1</b>	<b>26.1</b>	<b>4.8</b>	<b>30.9</b>
<b>Chile</b>	<b>5.5</b>	<b>1.0</b>	<b>9.4</b>	<b>1.4</b>	<b>17.2</b>	<b>8.1</b>	<b>25.3</b>
<b>Colombia</b>	<b>5.7</b>	<b>0.2</b>	<b>5.6</b>	<b>2.2</b>	<b>15.6</b>	<b>12.6</b>	<b>28.2</b>
<b>Costa Rica</b>	<b>3.2</b>	<b>1.3</b>	<b>8.9</b>	<b>6.4</b>	<b>19.8</b>	<b>2.7</b>	<b>22.5</b>
<b>Mexico</b>	<b>2.3</b>	<b>2.0</b>	<b>3.7</b>	<b>1.3</b>	<b>9.3</b>	<b>13.3</b>	<b>22.6</b>
<b>Peru</b>	<b>5.2</b>	<b>1.4</b>	<b>7.0</b>	<b>1.6</b>	<b>15.1</b>	<b>3.1</b>	<b>18.2</b>
<b>Uruguay</b>	<b>2.6</b>	<b>1.9</b>	<b>10.1</b>	<b>6.2</b>	<b>20.8</b>	<b>6.2</b>	<b>27.0</b>
France	2.2	9.0	15.1	18.5	44.7	4.6	49.4
Germany	0.8	9.8	12.0	18.6	41.1	3.1	44.2
Italy	2.5	11.2	14.5	13.1	41.3	2.6	44.0
Japan	2.9	4.6	8.3	10.6	26.3	1.5	27.8
Korea	3.1	4.0	12.8	4.7	24.5	3.1	27.7
Spain	3.4	7.2	12.0	13.7	36.2	2.7	38.9
United Kingdom	2.9	12.5	13.3	7.8	36.4	3.0	39.4
United States	2.1	9.1	7.3	7.0	25.4	4.9	30.4

Note: Data is referred to 2003 for the OECD excluding Chile and Mexico, 2008 for Uruguay and 2006 for Latin America.  
Source: ECLAC-ILPES and IDB databases, and Girouard and André (2005).

Table 9

## Tax Elasticities

Country	Corporate Income Tax	Personal Income Tax	Indirect Taxes	Social Security Contributions	Total over Cycl-adj Taxes	Total over GDP
<b>Argentina</b>	<b>0.83</b>	<b>3.61</b>	<b>1.00</b>	<b>1.08</b>	<b>1.16</b>	<b>0.27</b>
<b>Brazil</b>	<b>1.17</b>	<b>2.72</b>	<b>1.00</b>	<b>1.44</b>	<b>0.95</b>	<b>0.25</b>
<b>Chile</b>	<b>0.66</b>	<b>3.51</b>	<b>1.00</b>	<b>1.30</b>	<b>1.30</b>	<b>0.14</b>
<b>Colombia</b>	<b>0.96</b>	<b>2.65</b>	<b>1.00</b>	<b>0.55</b>	<b>0.94</b>	<b>0.14</b>
<b>Costa Rica</b>	<b>0.27</b>	<b>4.49</b>	<b>1.00</b>	<b>1.67</b>	<b>1.31</b>	<b>0.27</b>
<b>Mexico</b>	<b>0.69</b>	<b>2.95</b>	<b>1.00</b>	<b>0.76</b>	<b>1.29</b>	<b>0.13</b>
<b>Peru</b>	<b>0.38</b>	<b>5.33</b>	<b>1.00</b>	<b>1.94</b>	<b>1.54</b>	<b>0.18</b>
<b>Uruguay</b>	<b>1.18</b>	<b>2.85</b>	<b>1.00</b>	<b>0.95</b>	<b>1.17</b>	<b>0.25</b>
<b>LAC</b>	<b>0.69</b>	<b>3.61</b>	<b>1.00</b>	<b>1.28</b>	<b>1.22</b>	<b>0.19</b>
Canada	1.55	1.10	1.00	0.56	1.03	0.34
France	1.59	1.18	1.00	0.79	0.98	0.49
Germany	1.53	1.61	1.00	0.57	0.96	0.44
Italy	1.12	1.79	1.00	0.86	1.18	0.40
Japan	1.65	1.17	1.00	0.55	0.92	0.39
Korea	1.52	1.40	1.00	0.51	1.04	0.25
Spain	1.15	1.92	1.00	0.68	1.08	0.39
United Kingdom	1.66	1.18	1.00	0.91	1.10	0.34
United States	1.53	1.30	1.00	0.64	1.05	0.24
OECD	1.47	1.21	1.00	0.71	1.02	0.40

Note: LAC unweighted average. OECD unweighted average, excluding Chile and Mexico.

Source: Authors' calculations for Argentina, Chile, Colombia, Costa Rica, Mexico and Uruguay, De Mello and Moccero (2006) for Brazil, and Girouard and André (2005) for the rest.

### ANNEX 3 COMMODITY SERIES

#### Argentina

We consider export taxes introduced in 2002 (“Derechos de exportaciones”). All data are available at: <http://www.mecon.gov.ar/sip/basehome/rectrib.htm>

Prices come from the IMF commodity price database (food and energy indices) and are weighted according to their importance in exports.

#### Chile

- Corporate income tax paid by CODELCO
- Transfers from CODELCO to the central government
- Royalties paid by private mining firms

All these data come from DIPRES ([www.dipres.cl](http://www.dipres.cl)). The price adjustment is based on a 10-year rolling window average of copper prices from COCHILO (refined copper prices BML/LME in US\$).

#### Mexico

- PEMEX net income
- Royalties paid by private firms in the petrol sector to the federal government
- Special tax on petrol related income
- Specific net excise tax (IEPS)

All data come from the SHCP ([www.apartados.hacienda.gob.mx](http://www.apartados.hacienda.gob.mx)). The price adjustment is based on a 10-year rolling window oil prices from the IMF commodity price database.

#### Peru

- Royalties paid by mining sector
- Corporate income tax paid by mining and hydrocarbon sector, petrol refinery, fishing sector, non-metal minerals
- General Internal Sales Tax of same sectors

Prices are taken from the IMF commodity prices database (copper, fishmeal, oil and gold), weighted by importance of sectors in revenues.

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# THE IMPACT OF THE INTERNATIONAL FINANCIAL CRISES UPON EMERGING ECONOMIES AND THE PERFORMANCE OF DISCRETIONARY FISCAL POLICIES: THE CASE OF ARGENTINA

*Ernesto Rezk,\* Ginette Lafit\* and Vanina Ricca\**

## 1 Introduction

The last world financial crisis that started in the United States in September 2007, and spread thereafter across countries in the European Union, did not hit Latin America with the same negative impact that previous crises did for the simple reason that emerging countries in the Region exhibited in this occasion both lower external private and public debt exposure and better macroeconomic fundamentals which somehow permitted them to isolate their public sectors and domestic financial systems from turbulences.

Nevertheless, negative impacts began soon to be felt via economies' external sector as the international debacle dwindled the world demand for developing countries' manufactured and non manufactured exports which not only reduced economic sectors' levels of activity and employment but also imposed serious strains upon their public finances, as governments found themselves not only with fiscal revenues curtailed but also facing internal demands for more active fiscal policies implying tax reductions, expenditure increases or both.

In the meantime, and contemporaneously to the development of the crises, an important debate was taking place on whether discretionary fiscal policies should be resorted to, in place of automatic stabilizers, in order to check cyclical problems, whose reach went beyond the pure theoretic interest as it held important economic policy implications. Let it in this connection suffice to mention Auerbach's (2002) arguments that while considerable doubts remained about the real impact of discretionary fiscal policies upon output and its effectiveness to really play stabilizing roles, automatic stabilizers contributed to reducing cyclical fluctuations, despite attributes in tax systems that tended to weaken their real potential. In the same line of reasoning, Taylor (2008) asserted that "despite this widespread agreement of a decade ago, there has recently been a dramatic revival of interest in discretionary fiscal policy (...) nevertheless, after reviewing the empirical evidence during the past decade and determine whether it calls for such a revival, I find that it does not".

In the light of the preceding observations, and having been Argentina one of countries whose manufacturing sectors suffered the consequences of the international recession, the paper aims at showing, in the first place, the extent to what the international crises hit government's tax revenues (both those stemming from the external trade as well as those whose yield depends on the internal activity level). Second, the reduction of the primary fiscal surplus will be analyzed in order to determine the percentage of the fiscal loss that can be explained by the working of automatic stabilizers as compared to the percentage directly responding to the fall in the activity level.

Next, the argument will be assessed that in Argentina, contrariwise to other emerging countries, international crises can not solely be blamed for the government's fiscal difficulties as other causes, stemming mainly from domestic economic and political decisions, intertwined with the former's negative impact on fiscal balances and contributed also to eroding primary fiscal surpluses. In this connection, the point will be assessed of whether required stimulus measures were of an adequate size and, at the same time, if discretionary fiscal actions combined tax

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reductions and increased expenditures or only privileged one side of the government's budget restraint.

The plan of the paper is as follows: Section 2 surveys some seminal papers and the recent theoretical and empirical literature related to the actual effectiveness or efficacy of discretionary fiscal policies, in the light of international crises and their world impact; Section 3 presents the stylized facts, which include a brief analysis of the performance of some relevant Argentine macroeconomic variables as well as the evolution of economic activity indexes and of government revenues and expenditures, as of the occurrence of the last international crisis; Section 4 includes methodologies for assessing the impact of alternative fiscal policies and present some results, and Section 5 concludes.

## 2 Discretionary fiscal policies in the literature

Even though discretionary fiscal policies have been, more often than not, used to produce countervailing expansionary or contractive effects to reverting the impact of cycles upon aggregate demand, the literature has in general not shown unanimity at the moment of assessing its efficacy nor are empirical evidences conclusive in supporting the argument of active fiscal policies' superiority respect of automatic stabilizers (such as built-in flexibility of taxation) or monetary policies.

Despite Keynesian discretionary fiscal policies' appeal to policy makers, attention received in the literature, as early as the forties in the past century, adopted a critical stance towards their effectiveness. In particular Friedman (1948) expressed that no attempt should be made to vary the volume of government expenditures (goods, services or transfers), either directly or inversely, in response to cyclical fluctuations in business activity, as changes in spending should solely be made on the basis of the community's desire, need, and willingness to pay for public services. In the same line, Friedman considered that tax structures should not be changed in response to cyclical fluctuations, though actual receipts will, of course vary automatically.

Johansen's text (1965), in discussing alternative forms of stabilization policy, gathered in turn the most common criticisms on the use of active fiscal policy; first, the question of timing or how to ensure that measures were applied at the right moment; second, the matter of the appropriate dosage of measures, in terms of strength or size, faced both the problems of shortage of information and a somewhere incomplete knowledge of the reaction mechanisms in operation; third, unavoidable lags of various kinds in the case that time was needed to perform decisions (*i.e.*, parliamentary delay in studying and enacting tax or spending laws, tax legal lags, administrative lags) might cause that the expected impact of measures to be thwarted and, even worse, that untimely discretionary measures helped to deepen rather than to ease the effect of cycles; fourth, certain capital outlays proved difficult to be used counter cyclically as their planning, construction and legal arrangements could take a long time and, at the same time, stopping constructions for stabilization purposes might cause a greater loss in terms of efficiency of resource allocation, particularly when expenditures were directed towards sensible projects. In discouraging the use of capital expenditures for stabilization, Johansen ended by suggesting that taxes were more suitable to regulate the level of total demand.

On a slightly different but also valuable view of the matter, the seminal paper by Musgrave and Miller (1955) started by emphasizing that the essence of compensatory fiscal policy lied in adjusting government receipts and expenditures so as to induce stabilizing patterns in the economy by increasing spending and reducing tax revenues during depressions, and proceeding in a converse way when inflationary pressures prevailed. These authors expressly acknowledged that compensatory effects could not only stem from properly timed changes in expenditure programs

and in tax rates but also be brought about automatically by diverse means, as for instance when built-in flexibility features characterized tax structures.<sup>1</sup> Nevertheless, and quoting empirical evidence from the United States, Musgrave and Miller arrived at the important conclusion that although preliminary results suggested that automatic stabilizers might be important to maintaining stability over the long run, the empirical analysis did not confirm the growing assertion that built-in flexibility sufficed and that deliberate countercyclical fiscal policy could be dispensed with.

More recently, Blanchard and Perotti (1999) somehow entered the debate by using a structural VAR model based on institutional information<sup>2</sup> on tax, transfer systems and the timing of tax collection in order to assess their automatic response to activity or, in other words, to identifying the dynamic effects of fiscal innovations upon economic activity in the United States in the period following World War Two. In documenting the effect of fiscal policy on economic activity, the authors emphasized that budget variables might move for a set of reasons within which output stabilization might not be predominant whereas, and at the same time and due to decision and implementation lags, at a quarterly frequency, little or no discretionary responses of fiscal policy to unexpected movements in activity have been noticed. In concluding Blanchard and Perotti, though confirming respectively the positive and negative effect of government spending and tax shocks upon output, their empirical investigation cast doubts on the size and variation of these effects as in most cases multipliers were small and often close to one; added to this, they found that, conversely to the case of private consumption, private investment was crowded out by spending innovations.

In well known contribution by Taylor (2000) a rather critical stance was sustained on the actual countercyclical strength of discretionary fiscal policies, in view of what he asserted to be more frequently seen a greater effectiveness of automatic stabilizers and monetary policies in stabilizing the level of aggregate demand backed, in the case of the former, by the larger overall size of changes in taxes and spending compared to those in active fiscal policies, let alone the fact that automatic changes (especially those based on non cyclical progressivity of the tax and the transfer system) impacted upon aggregate demand in a more predictable way and more quicker than the discretionary ones. In analyzing the efficacy of both automatic stabilizers and monetary policies *vis-à-vis* discretionary fiscal policies Taylor recalled again that the latter were conditioned by implementation lags for what a substantial amount of time was required, after the need was acknowledged, to changing (in the right dosage) government spending and tax rates for impacting on the demand level affected by the cycle; apart from this, the possibility that forward looking agents disregarded temporary measures also run counter discretionary fiscal stabilization policies' chances of success.

Taylor also insisted on two important features of monetary policies and automatic stabilizers; that is, the greater flexibility to changing instruments and the element of certainty monetary policy rules provided, the latter feature being also found in fiscal automatic stabilizers owing to their greater predictability. On the contrary, the traditional contention that discretionary fiscal policies had to put up with the problems of implementation lags, irreversibility and political constraints seemed, in Taylor words, to have undermined more in recent years the confidence on the impact of active fiscal policies.<sup>3</sup> Nevertheless, Taylor pointed out a number of situations in which the performance of active fiscal policies seemed to fare better than its alternatives: first, when nominal

<sup>1</sup> Musgrave and Miller provided in their article a form of measuring the degree of built-in flexibility in terms of the community's propensity to consume, the income elasticity of the tax yield and the average tax rate.

<sup>2</sup> In words of Blanchard and Perotti, this would permit to construct estimates of the effects of unexpected changes in activity upon fiscal variables (*i.e.*, estimates of fiscal policy shocks).

<sup>3</sup> Conclusions from Blanchard and Perotti (1999) are in this connection quoted by Taylor as an example of his assertion.

interest rates were approaching 0 and monetary policies lose power to stimulate demand further;<sup>4</sup> second, under a Mundellian fixed exchange rate with capital mobility framework world interest rates were given to countries, the cyclical function would have to be performed by fiscal policy as monetary policies were constrained not to react cyclically; third, in the consideration of long term issues, which naturally required less frequent changes, discretionary fiscal policies seemed to be reserved a more favorable position in relation to monetary policies or automatic stabilizers.

Contemporaneously to Blanchard's paper, Cohen and Follette's contribution (2000) on the theoretical and empirical analysis of automatic fiscal stabilizers using post World War II U.S. data also added collateral but rich arguments to the debate over alternative stabilizing fiscal policies. In assessing Romer's assertion (1999) that the fact that post war recessions had become less frequent and business expansions substantially longer in the U.S. should be attributed to the rise of macroeconomic policy in the period and, particularly, to automatic fiscal stabilizers (income-based tax system and unemployment insurance benefits mainly) playing a prominent role changing likely recessions into periods of normal growth,<sup>5</sup> Cohen and Follette presented intriguing and ambiguous empirical results as by means of frequency domain techniques they were able to show strong links between income cyclical variations and federal government and taxes that in turn suggested automatic fiscal stabilizers' potential to play a quantitatively important stabilizing role but their results were less conclusive when resorting to a large scale macro-econometric model of the U.S. economy (FRB/US) as, in spite of being able to prove that automatic fiscal stabilizers had a large damping effect upon personal consumption expenditures, they were seen to play a very modest role in damping the short-run effect of aggregate demand shocks in real GDP and also little stabilization provided in the case of an aggregate supply shock fell well short of expected.

The possible over reliance on automatic stabilizers, as a form of mitigating fluctuations in aggregate demand without any explicit, or only little, government intervention was also investigated by Auerbach and Feenberg (2000) using a simulation model based on a file of actual tax returns for the period 1962-95 and in which the impact of hypothetical changes in income and its components upon individual tax payments was considered. By recalling usual arguments they stressed that automatic stabilizers (such as the federal income tax in the U.S.) avoided lags in implementation that could cause discretionary fiscal policy to run behind the events. However, they conditioned the effectiveness of automatic stabilizers to theirs being able also to offset shock-caused falls or rises in aggregate economic activity; that is, the possibility of inducing also private purchases via an increase in disposable income.<sup>6</sup>

In analyzing results achieved, Aschauer and Feenberg pointed out that when measuring the tax system's role as an automatic stabilizer, the income elasticity of taxes had the severe shortcoming of being invariant with respect to whether the share of income taken as taxes was high or low, for what they suggested to take tax system's built-in flexibility or the ratio of the change in taxes with respect to a change in before-tax income. At the same time, the point was emphasized that the working of automatic stabilizers presumed that the effect of taxes on before-tax income changes made household expenditures on goods and services less volatile; nevertheless, such a result might not be consistent with the behavior of rational, forward-looking agents unless long lived increases were expected or when households faced a liquidity constraint depressing current consumption below its desired level. For all that, the authors concluded that there has been, since the 1960s, little change in the role of the tax system as an automatic stabilizer; in extending their arguments, they stressed that the tax system's effectiveness to stabilizing aggregate demand (via

<sup>4</sup> There is widespread consensus on that, with nominal interest rates hitting 0, further declines in the inflation rate would cause the real interest rate to increase and would reduce aggregate demand.

<sup>5</sup> Let alone their contribution in boosting growth in the first year following the recession trough.

<sup>6</sup> Aschauer and Feenberg quoted in this regard that it also mattered how large a private response in consumption the increase in disposable income generated.

changes in income tax, payroll tax, income distribution)<sup>7</sup> was lower than its estimated 1981 peak and rather similar to that of the 1960s. Finally, Aschauer and Feenberg acknowledged that regarding tax induced consumption responses as the most important single source of automatic stabilization of aggregate demand and considering that the former offset no more than 8 per cent of initial shocks to GDP, in line with what Cohen and Follette found in their application of a macro model, modest results somehow reaffirmed the limits of automatic stabilizers.

What seemed to be a stalemate situation in the controversy regained however recent strength, mainly as a consequence of last international crises started in 2007 in the U.S. and transmitted to European economies and to countries elsewhere, as several new papers on the revival of fiscal policy suggest. In this regard, Taylor's new contribution (2009), based on an empirical analysis for the U.S. economy as of 2001, was intended to reassert his traditional contention that fiscal policy should avoid countercyclical discretionary actions and focus instead on automatic stabilizers. In illustrating his viewpoint, Taylor referred to two important countercyclical discretionary measures in the decade: the large temporary tax rebates of 2001 and 2008 which, in both cases coincided with recessions started in March 2001 and December 2007 and exhibited no response or implementation lags or lack of timing that normally reduce the efficacy of active fiscal policies; nevertheless, when the evolution of series of disposable personal income with and without the inclusion of rebate payments to individuals and families and of personal consumption expenditures were drawn, results exhibited the conclusion that temporary rebates did not do much to stimulate consumption and aggregate demand. This revealing feature fell in line with the permanent income theory (life cycle theory) in which temporary increases in income were predicted to lead to proportionately smaller increases in consumption than a permanent rise in income<sup>8</sup> for what Taylor concluded that the effect of tax rebate payments on aggregate consumption did not avail the idea that a revival of discretionary fiscal policies was necessary for stabilizing purposes.<sup>9</sup> This author also analyzed empirical evidence on how automatic stabilizers had changed over time in the U.S., for what he resorted to an econometric estimation of coefficients of structural and cyclical deficit components on GDP gap and concluded from figures shown that while the coefficient on the cyclical component remained fairly constant around 0.34 or 0.35, the coefficient on the structural component increased a dramatically over time; should the latter's high responsiveness continue into the ongoing recession, automatic stabilizers would be very powerful. In sum, shown empirical results did not yield evidence – on Taylor's words – to change the agreement of a decade ago to focus fiscal policy on automatic stabilizers rather than on discretionary fiscal policy.

Feldstein (2009) in turn wondered why governments all around the world were now resorting to massive stimulus packages when no more than two years ago there was consensus among economists that active fiscal policy was not an appropriate countercyclical instrument. In attempting to rationalize the mentioned discredit of discretionary measures, Feldstein recalled that the potential stabilizing contribution of active tax and spending Keynesian fiscal policy was challenged by empirical research that showed that the Keynesian multipliers were in fact much more smaller than assumed due to crowding out of interest-sensitive spending caused by the induced rise in the demand for money and by the effect of the larger national debt on long term interest rates, let alone demand leakages produced by imports and fiscal impacts upon the exchange rate whose ultimate outcome were a reduced value for the multiplier. Also, uncertainties on whether stimulus packages performed after the trough in economic activity might also help active fiscal policies to increase cyclical volatility.

<sup>7</sup> They also included indexing provisions, factoring in heterogeneity with respect to consumption responses and income volatility.

<sup>8</sup> Taylor stressed however that life cycle theories were approximations no taking into account liquidity constraints making it difficult for some consumers to borrow.

<sup>9</sup> Taylor also included simulations for the impact of government spending finding also little reliable empirical evidence that discretionary public expenditures led to ending a recession or to accelerating a recovery.

In spite of the above mentioned shortcomings, Feldstein based the revival of fiscal policy in that, contrariwise to past recessions caused by sharp counter inflationary interest rates rises, the 2007 U.S. crisis was the result of underestimated risks and excessive leverage the natural sequence being widespread defaults on subprime mortgages, massive erosion of families' wealth, marked contraction of consumer expenditures and a fall in firms investment and real estate values. Feldstein completed this grim description by stressing that the high damaging impact the decline of value of mortgage-securities and derivatives had on the capital of financial institutions and the disruption of the credit market made monetary policy (reduction of interest rates) incapable of dealing with the problem and explained also the sudden economists' advocacy for fiscal stimulus.

In acknowledging the new different scenario, Feldstein further advanced in considering why traditional arguments against discretionary fiscal policies might not longer be an impediment, in particular the delays in starting infrastructure projects (as downturn in aggregate demand is expected to last longer than previous recessions) and the possibility of governments to accede to debt not likely to be offset by higher interest rate. In the same line of reasoning, the author mentioned alternative forms of tax reductions (other than the one-time tax cut) that could be successfully used, as well as various forms of investment tax credits. Finally, proposals of design were advanced as necessary conditions to make the fiscal package a successful stabilizing tool are advanced; in this connection, the objectives of increasing both private consumption and business investment called, according to Feldstein, for the indefinite postponement of individual income tax rate increases and tax rates on dividends and capital gains while, in turn, these tax policy recommendations needed to be accompanied by large and fast (speed of outlays) and government spending<sup>10</sup> properly targeted at fostering aggregate demand and employment.

Several years after the paper on automatic stabilizers (2000), co-authored with Feenberg, Auerbach (2009) revised U.S. crises and discretionary stabilizing experiences since 1982 and attempted in turn to explain the new fiscal activism on grounds that the effectiveness of monetary policy was challenged given the severity of the recession stemming from 2007-08 crisis and that the strength of automatic stabilizers weakened over time due to indexation of the individual income tax and reduction in marginal tax rates. Other arguments raised by Aschauer were the limit case of zero-nominal interest rate bound thwarting monetary policy's stabilizing efforts, in agreement with Taylor's stance on the matter, and also a new interpretation of the Lucas' critique<sup>11</sup> whereby there would be benefits for potential fiscal intervention in an environment characterized by nominal rigidities, liquidity constraints and credit-market disruptions.

But at the same time that Aschauer accepted that the particular circumstances of the 2007-08 U.S. recession gave room to a renewed fiscal activism, he warned about the relative little advances in discretionary policy application and made it clear that more and urgent attention should be given to policy design should policy makers expect active fiscal policy on a large scale render the expected results; in connection to this, the paper included an interesting empirical analysis of investment incentives in the period 1962-2007 and of how assumedly stabilizing designs might on the contrary end discouraging investments.

### 3 The stylized facts

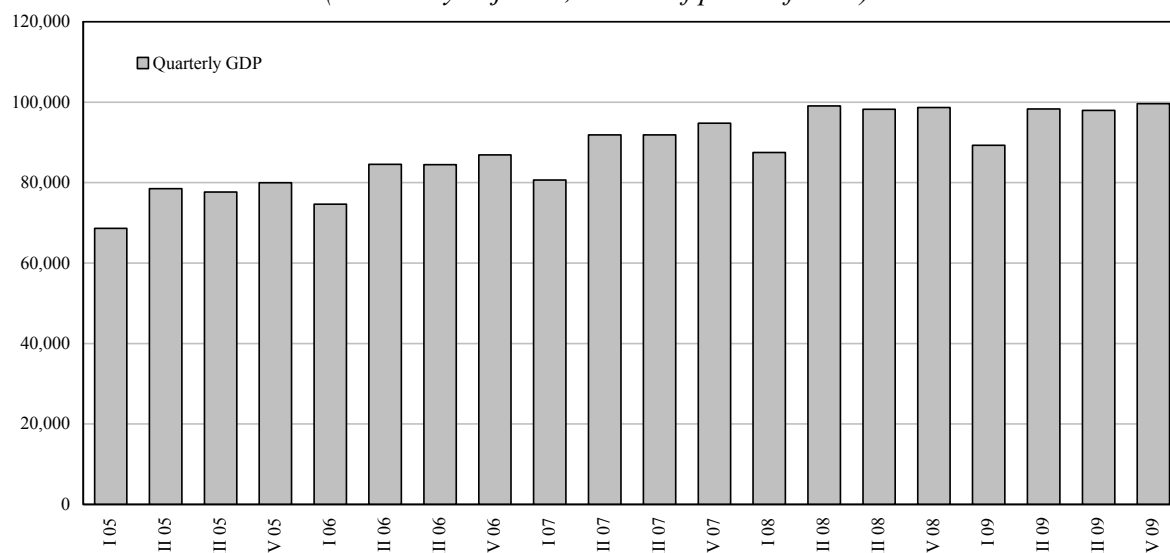
The ensuing set of diagrams intend to show whether the recession started in the U.S. in the

<sup>10</sup> In analyzing priority areas in which the government planned to increase outlays, Feldstein deemed as an important omission in the stimulus package to rule out temporary funding increases in the field of defense, intelligence and research.

<sup>11</sup> Let it be remembering that the core of Lucas' critique (1976) was the idea that rational agents should respond to changes in policy and that would in turn reduce whatever potential efficacy countercyclical policies might have.

Figure 1

**Argentina – Quarterly Evolution of Gross Domestic Product**  
(seasonally adjusted, million of pesos of 1993)



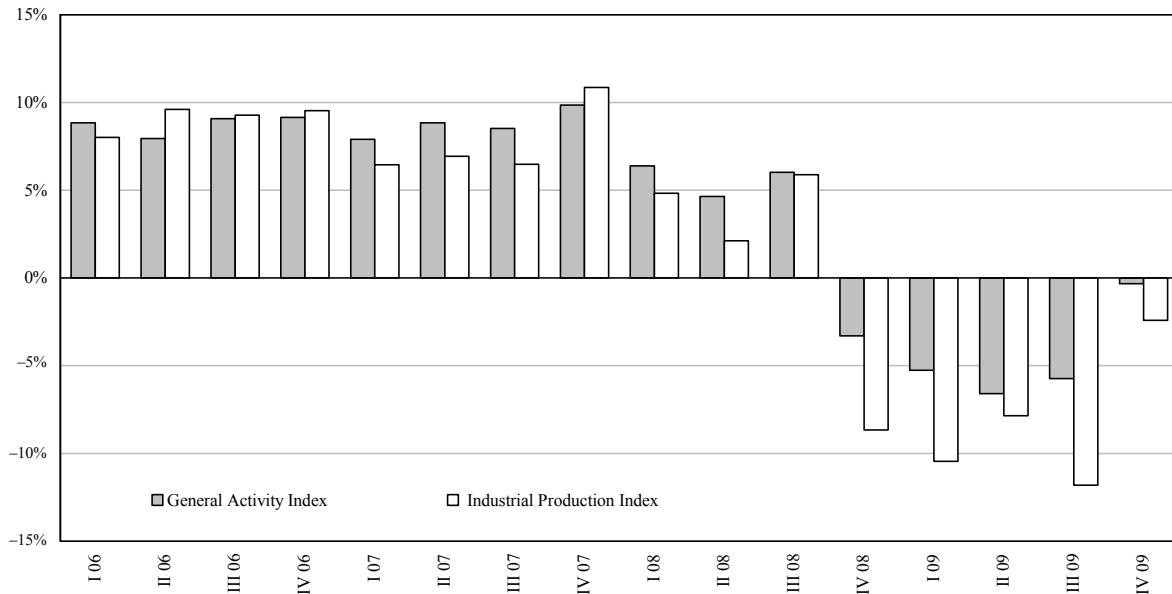
Source: Own estimates on the basis of data from the Secretary of Economic Policy, Argentina.

third quarter of 2007 and transmitted to Western Europe and other countries in Asia by the end of 2008 hit the Argentine or if, as hypothesized above, macroeconomic fundamentals somehow helped the country to insulate itself from the financial crisis, save for the negative impact of a dwindled world demand for its exports.

At first sight, the evidence yielded by the Figure 1 indicates a steady growth of the quarterly gross domestic product spanning until 2008, and only interrupted by the cyclical performance shown by all the first quarters. However growth rates, ranging from 8.5 to 9.2 per cent in the first three years, fell to 6.8 per cent in 2008 and reached an almost nil value in 2009 for reasons that partially responded to the international crises but also (and perhaps mainly) to government's policies adding uncertainty to the decision-making process of domestic economic sectors; in this regard, developed countries' contracted demand of manufactured goods and the subsequent export fall of emerging economies combined in Argentina with negative domestic government decisions including banning on certain agricultural exports (such as beef meat, dairy products, wheat and maize) and the raise of export duties on soybean that brought about supply's reductions, withholding of commercial transactions and the loss of government revenues.

The negative impact of the 2007-08 international crises on Argentine industrial sectors is partly reflected by the ensuing Figure 2 in which the performance of the inter annual rates of change of General Activity and Industrial Production Indices from 2006 through 2009 is depicted. As can be seen, the evolution of both indices kept a cyclical but slightly rising trend until the end of 2007 and fell abruptly thereafter with lower though positive figures in 2008 and negative values in 2009. It needs however be emphasized that, apart from the loss of markets abroad due to the crises (mainly those belonging to NAFTA), industrial production levels were also damaged by the sluggish rate of growth of private investment that fell from an annual 18.2 per cent in 2006, to 13.6 per cent in 2007, 9.1 per cent in 2008 and a negative figure of around 10 per cent in 2009. Most analysts coincided on that a greater government intervention in the economy, the state

Figure 2

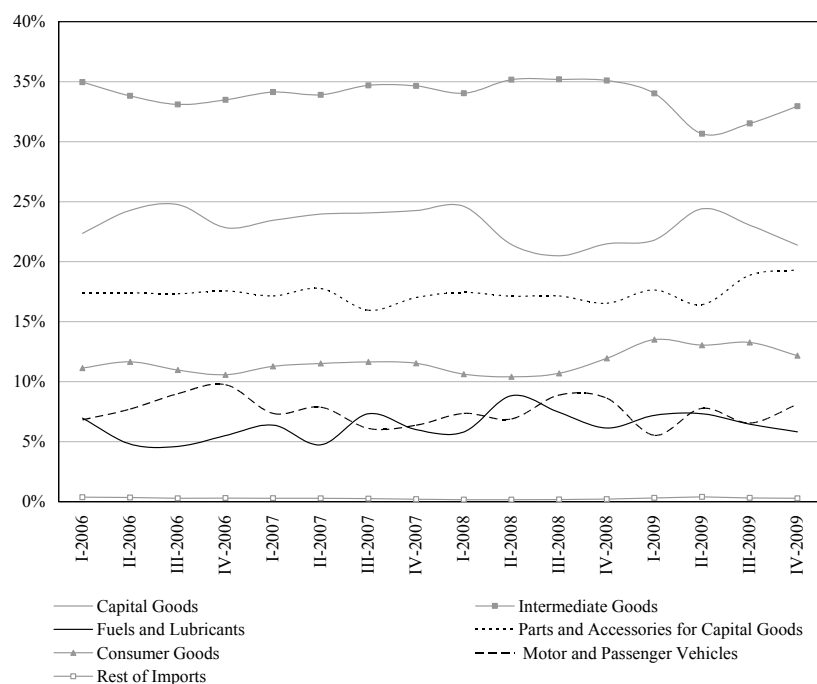
**Argentina – Inter Annual Rates of Change of General Activity and Industrial Production Indexes**

Source: Ferreres, O.J. y Asociados, Database, Buenos Aires (Argentina).

takeover of some formerly privatized public utilities and of the private pension system and advances considered unduly upon property rights were the main causes discouraging further domestic and international private investment in the country.

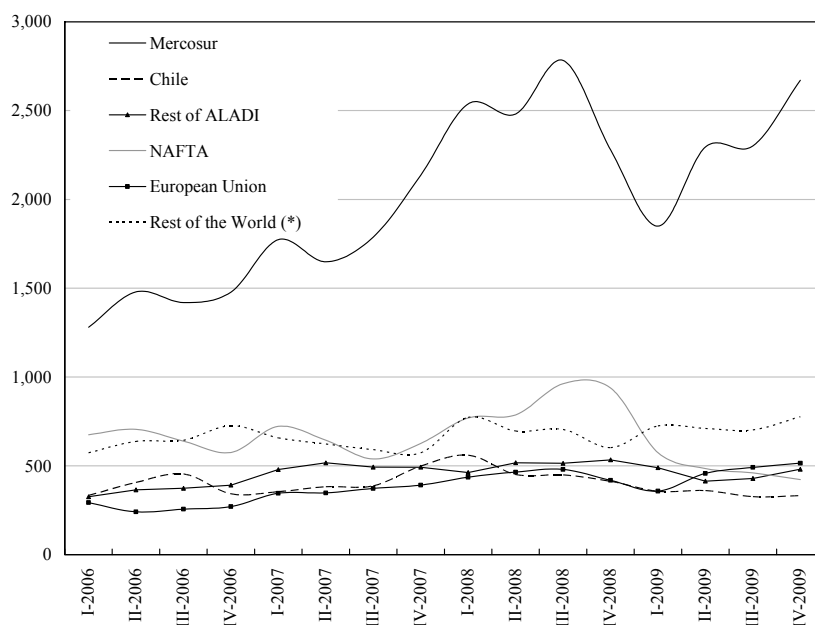
From a different angle, data from Figure 3 serve to confirm that whatever damaging effects smaller exports – due to international crises – might have had upon domestic industrial sectors, the sluggish behavior of investment mattered more; in this connection, import's component percentages show that the fall in the participation of capital and intermediate goods and of spare parts for

Figure 3

**Argentina – Quarterly Evolution of Import's Components (percent of total imports)**

Source: National Institute of Statistics and Censuses (INDEC), Argentina.



**Figure 4****Argentina – Quarterly Evolution of Industrial Goods Exports**  
(million of current dollars)

Source: Data from the National Institute of Statistics and Censuses (INDEC).

(\*) Including: Rest of ALADI, EU, ASEAN, China, Republic of Korea, Japan, India, MAGHREB and Egypt and the rest of the world.

capital goods was noticeable as of I-2007, when the U.S. crisis was still to burst; thereafter only imports of intermediate goods and of spare parts and accessories for capital goods reverted in 2009 the downward trend whereas the relative participation of capital good imports continued declining. As imports did not keep up pace with exports, the impact of the mentioned feature was still higher as the smaller relative participation of imports needed for industrial sectors to keep going corresponded also to smaller total import levels, relative to other macroeconomic variables such as exports and output.

As referred to above, the negative impact of the 2007 U.S. crisis and the subsequent 2008 problems in many European developed economies upon Latin American countries' export sectors, intertwined in Argentina with domestically unsolved policy problems that outweighed the effects of international crises. In support of this assertion the coming Figure 4, depicting the quarterly evolution of industrial good exports in the period 2006-09, renders evidence that the negative impact of crises was only relatively felt by domestic manufacturing sectors in reason of the country's membership to the regional economic integration known as MERCOSUR; as shown below, whatever negative effects arising from NAFTA – as of 2007 – and European countries' imports in 2008 were compensated by increased exports to Brazil and that permitted to make up the trade losses from other importing origins.

Contrariwise to the above mentioned case, exports of agro-industrial goods and agricultural commodities highlight the already mentioned domestic problems as exports kept growing steadily throughout the crises' development and only fell by 2009 when the consequences of export bans and quotas and tax rate increases began to be felt. Negative effects of the international crises were however visible with respect to China (one of Argentina's single most important customers) as its agro-industrial imports moved back during 2008 whereas imports of soybean started to shrink in 2007 and behaved cyclically until the end of 2008. Again, lower 2009 exports responded to the supply scarcity in origin of exportable agricultural goods mainly due to domestic withholding of operations by farmers.

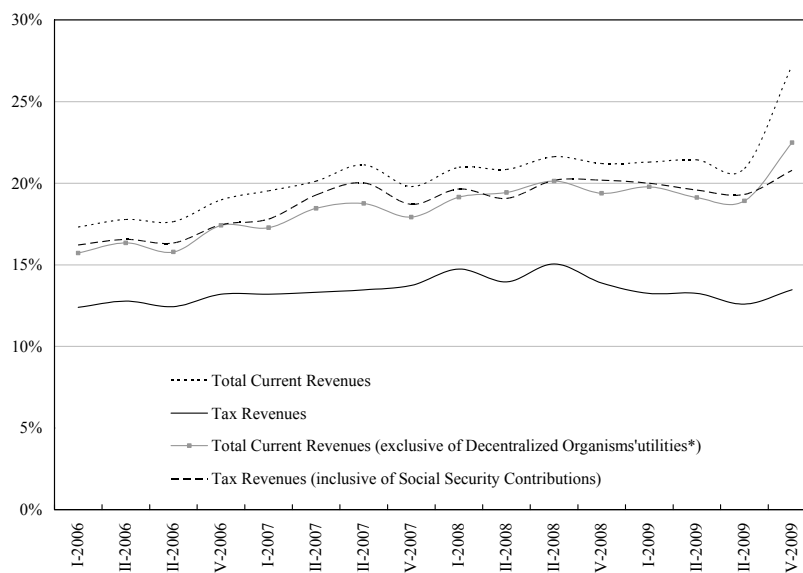
The extent to which the impact of the international crises and of domestic problems actually affected the sustainability of Argentine public finances, as well as the room the federal government had to undertake active fiscal policies, is immediately shown in the following diagrams depicting

the performance of public revenues and expenditures and the evolution of the federal government primary surplus in the period 2006-09, all in terms of GDP. At first sight, seasonally-adjusted series from Figure 5 show that tax revenues kept growing until year 2008 when they began to exhibit a cyclical pattern and, as of the third quarter of 2008, a marked declination; nevertheless, the negative effects upon federal revenues were modest and mainly reflected the stagnation of the income tax yield in less than 5 percentage points of GDP (Figure 7).

The Argentine federal government somehow succeeded in isolating its overall revenues' performance from the negative impacts of 2007 and 2008 international crises since, as shown by the Figure 5 for quarterly values and in the bars for annual values (Figure 6), both the series for tax revenues (inclusive of social security contributions) and total current revenues slightly rose in the period under analysis; the point is however worth mentioning that it was a discretionary change allowing contributors belonging to the Private Individual Capitalization Regime to switch to the PAYG system, followed

Figure 5

### Argentina – Quarterly Evolution of Federal Public Revenues (seasonally adjusted variables, percent of GDP)

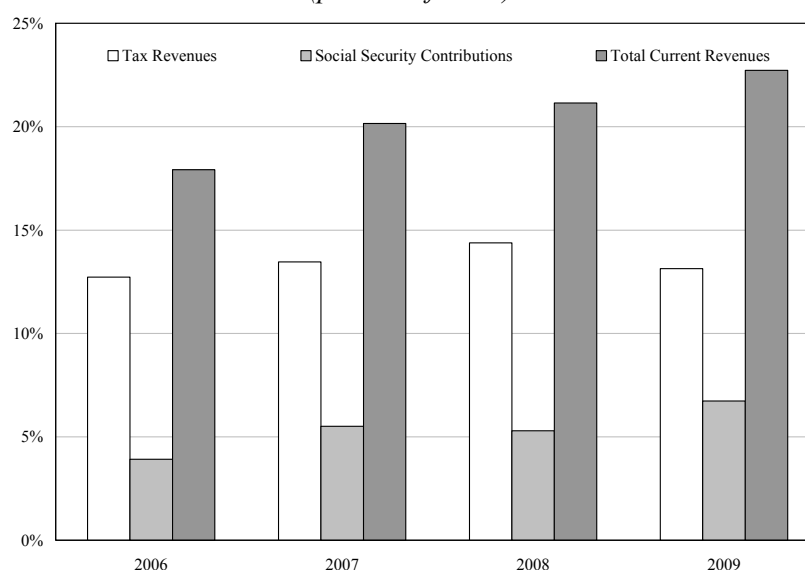


Source: Data from Secretary of Economic Policy and National Bureau of Investigation and Fiscal Analysis, Argentina.

(\*) Decentralized Organisms' utilities includes utilities from Central Bank and ANSeS and Special Drawing Rights.

Figure 6

### Argentina – Federal Government's Current Revenues (percent of GDP)



Source: Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis.

Figure 7

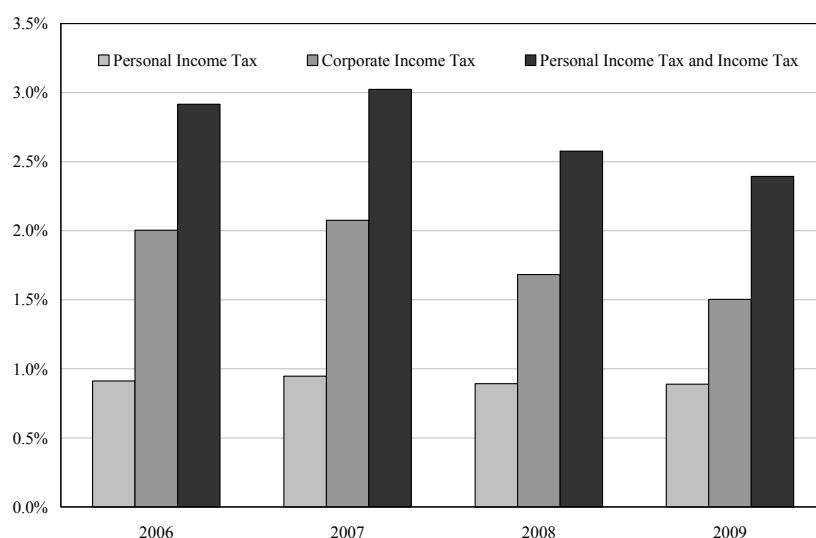
**Argentina – Evolution of Income Tax,  
Value Added Tax and Social Security Contributions  
Perceived by the Federal Government  
(percent of GDP)**



Source: Data from Secretary of Economic Policy and National Bureau of Investigation and Fiscal Analysis.

Figure 8

**Argentina – Evolution of Individual and Corporation Income  
Tax perceived by the Federal Government  
(percent of GDP)**



Source: Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis.

by the elimination of Private Pension Funds in 2009, what determined the evolution of the tax revenue series. The series for current revenues also reflects the favorable impact, in 2009, of the special drawing rights delivered by the International Monetary Fund among its member countries.

It must however be borne in mind that the negative effect of international crises upon government's revenues and budget surplus was rather limited on the following two accounts: the fall in industrial exports, by being generally tax exempted, did not directly affect tax revenues except for some slight loss in corporate income tax yield (see Figure 8) owing to industrial firms' lesser profitability; likewise the loss in revenues due to the mentioned withholding of agricultural exports was compensated in 2008-09 by a discretionary raise of tax rates for soybean and other commodities (Figure 9).

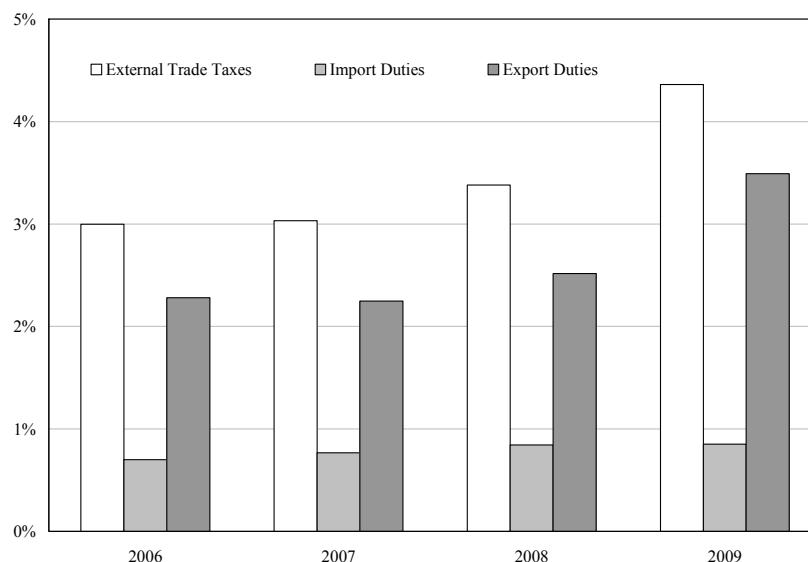
Figure 8 clearly reflect what has so far been argued in the sense that negative effects upon tax revenues stemming from ambiguous domestic economic policies outweighed those caused by international crises; in this connection, the declination of corporate income tax yield in

percents of GDP, shown by Figures 7 and 8, as well as the stagnation of economic growth rate in 2008-09 (Figures 1 and 2), reflect firms' lower production levels due to investment shortages in key sectors, lesser sales and an incipient unemployment rise that forced the government to resort to discretionary fiscal actions based on public expenditures.

In explaining therefore the Argentine federal government's fiscal strain, as said above hardly attributable to international crises, the emphasis must be placed in current public spending rather than in revenues since it results evident that the former's rate of growth did not keep pace but outweighed that of public current revenues; as shown by Figure 10, while revenues' participation in GDP climbed 27 per cent in the 2006-09, expenditures almost rose 60 per cent in the same period in response to the government's decision not to allow increases in tariffs of transport, electricity, gas and petrol. This in turn demanded ever-increasing budgetary subsidies to be permanently channeled to utilities and firms providing public services.

Figure 9

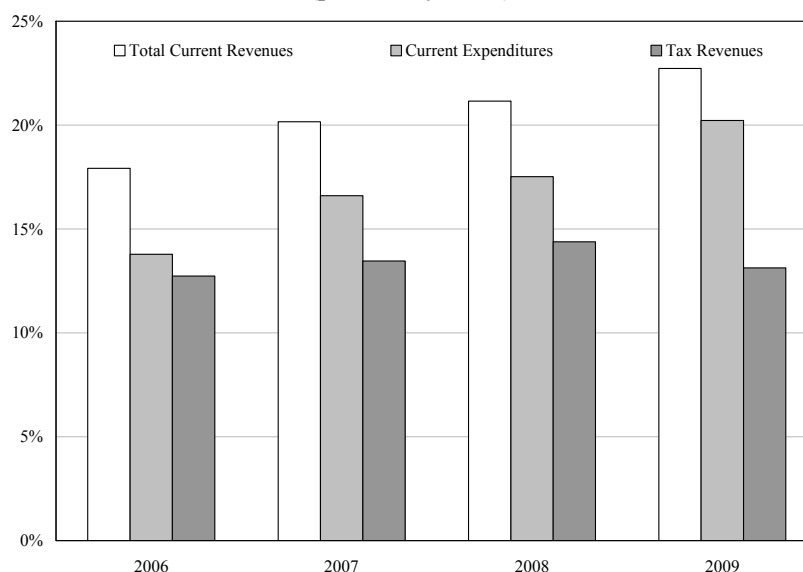
**Argentina – Evolution of External Trade Taxes raised by the Federal Government**  
(percent of GDP)



Source: Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis.

Figure 10

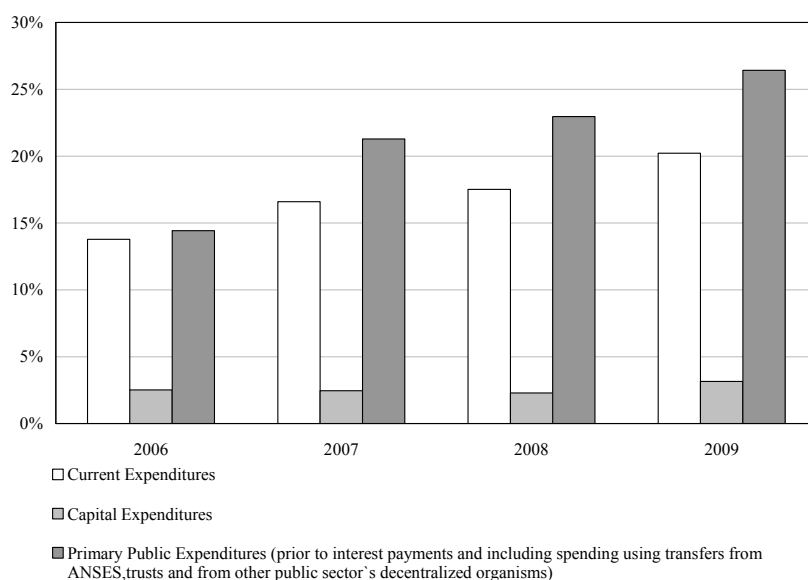
**Argentina – Federal Government's Current Revenues and Expenditures**  
(percent of GDP)



Source: Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis.

**Figure 11**

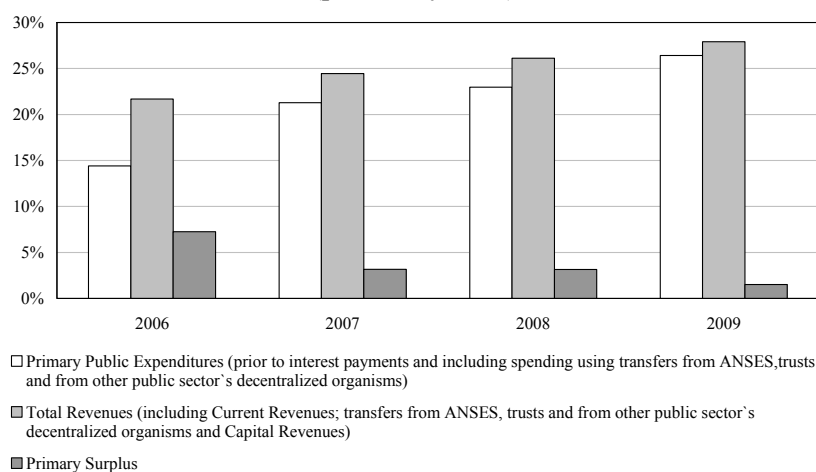
**Argentina – Federal Government's Primary Expenditures**  
(percent of GDP)



Source: Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis.

**Figure 12**

**Argentina – Federal Government's Total Revenues, Primary Expenditures and Surplus**  
(percent of GDP)



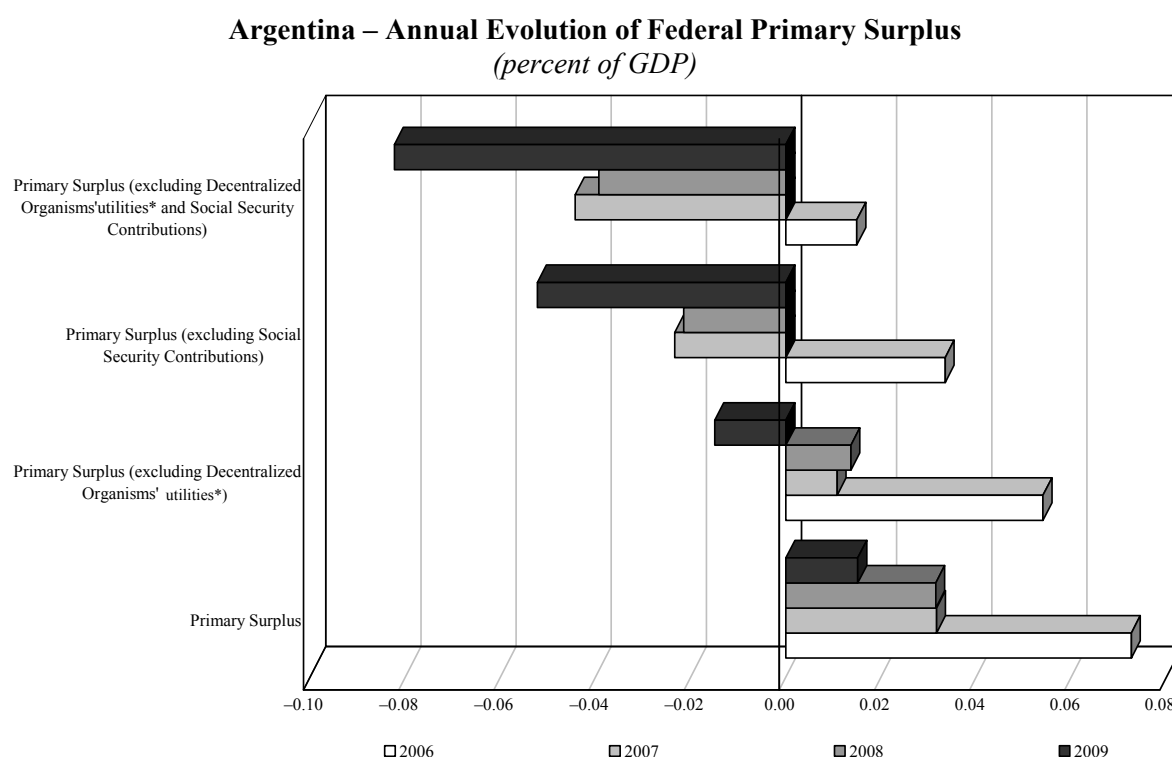
Source: Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis.

The impulse on public expenditures is also explained by the Argentine federal government's need to curb a slight but dangerous rise in unemployment following the stagnation of growth rates in 2008-09. The inflection point in the path of public spending is clearly depicted by the bar diagram in Figure 11 and mainly responded to fiscal discretionary actions basically concentrated in two programs: the first one, called Argentina works, seeking to promote micro firms and small cooperatives and the second one called Children's Universal Grant, aimed at curbing poverty and whereby households whose members were unemployed or informal labor were granted a monthly grant per child under eighteen.<sup>12</sup> Nevertheless, and as Figure 11 shows, capital outlays also grew in the period as the government also increased the financing of subnational and local infrastructure investment.

It goes without saying that the government's commitment to maintain, for political reasons, the freezing on

<sup>12</sup> Children's Universal Grant for Social Protection benefits unemployed persons and informal labor's 3,500,000 children (under eighteen) by granting their families a monthly payment of \$ 180 (50 dollars) per child subject to the condition of their regularly attending school.

Figure 13



Source: Data from Secretary of Economic Policy and National Bureau of Investigation and Fiscal Analysis.

\* Decentralized Organisms' utilities includes utilities from Central Bank and ANSeS and Special Drawing Rights.

tariffs immediately impacted upon the level of the primary surplus which, as Figure 12 shows, underwent a dramatic downward switch in the period 2006-09.

Figure 13, showing the evolution of the Primary Surplus when various definitions are taken into account, permits in turn to have a better knowledge of how the decision to use subsidies substantially eroded the former. By considering first the bottom of the figure, the primary surplus fell from 3.5 per cent of GDP, in 2006, to 1.5 per cent in 2009; nevertheless, the figure for the last year would be even smaller (0.6 per cent of GDP) should the exceptionally received IMF's Special Drawing Rights were not considered. Particularly worrying the picture at the top of Figure 13 results since, if social security contributions were not considered, the primary deficit would amount to 5-6 per cent points of GDP; the preceding assertion is revealing in respect of the present Argentine fiscal weakness which suggests, even ruling out effects of international crises, that the actual level of primary surplus mostly responds to exceptional revenue flows (as the special drawing rights) and to discretionary actions such as the seizing of the private individual capitalization regime occurred in 2009.

#### 4 Recent fiscal actions in Argentina. Measures of discretionary orientation and automatic stabilizers

##### 4.1 Two methodologies for assessing performance

When analyzing fiscal policy actions, cyclical factors that have a transitory effect upon

budget balances must be distinguished from structural changes causing a lasting impact on the result of fiscal actions since, when changes derived from active fiscal policies are not isolated from those stemming of fluctuations in economic activity, the performance of the budget balance is far from being a good indicator of governments' discretionary policies. Thus, the resulting budget outcome can be considered to stem from the following two elements:

- an economic environment induced component, associated to the concept of “cyclical balance” and that leaves aside the effect of other variables;
- a “structural balance” which will exist if the economy follows its long run growth path; therefore, its behaviour will depend on the policy operation and not on the current economic circumstances.

The cyclical balance, or “built-in stabilizer”, component of the budget balance should be self-cancelling as the cyclical output gap is closed so that it is temporary and non-structural. On the other hand, the structural budget is the one that would persist if the economy were to grow steadily at its highest sustainable unemployment rate, *i.e.*, the same as the potential output.

Muller and Price (1984) stated that the cyclically-adjusted indicator had advantages over the unadjusted budget balance in a number of respects:

- the analysis of short-term fiscal stance: the cyclically-adjusted budget balance can be interpreted as an index of “discretionary” policy action in the sense that it regards budget deficit changes as a cause rather than the effect of variations in economic activity;
- medium-term budget planning and control: separating cyclically self-correcting changes in the budget from more permanent shifts may enable the longer-run course of public spending and taxation to be controlled more efficiently;
- fiscal neutrality and economic stability: setting and pursuing budget balance targets independently of the phase of the business cycle implies the need to offset “automatic stabilizers”;
- the monitoring of potential financial market pressures: private sector credit demands may be lower in periods of cyclical demand weakness, and financial markets may thus be unaffected by fluctuations in government debts which are perceived as temporary. In that case, interest rates may be particularly influenced by the long run trend of accumulation of government debt in private portfolios. As a result, the structural budget deficit may then be a better gauge of government pressures on interest rate than the actual budget deficit.

Two methodologies are resorted to in this paper: the one by the IMF due to Heller, Haas and Mansur (1986), and the OECD's, by Girouard and André (2005) and van der Noord (2000). In both cases, the quantification of the discretionary action is obtained from the observed budget deficit, net of the variation caused by cyclical and non discretionary factors.

The IMF's index of Fiscal Policy orientation was originally developed by the German Council of Economic Experts (GCEE) and described in detail by Dernberg (1975).<sup>13</sup> The measure

<sup>13</sup> The measure currently used by the GCEE differs from the measure currently used by the Fund. Specifically, the cyclically neutral level of government expending is defined as being equal to the actual budget in the base period; more precisely:

$$H_t^n = g_0 Y^P + (n - r_0) k Y^P + (s_t - s_0) Y^P$$

where:

$$H_t^n : \text{Cyclically neutral level of government expending; } g_0 = \frac{G_0}{Y^P} : \text{Base-year expenditure ratio; } n = \frac{R_t}{k Y_t^P} :$$

(continues)

of the Cyclically Neutral Budget (CNB) was derived from the actual budget by assuming that nominal tax revenues are unit elastic with respect to actual nominal income, and government expenditures are unit elastic with respect to potential output valued at current prices. This indicator yields a measure of fiscal discretionary actions with respect to a benchmark year and is defined as:

$$CNB_t = (G_t - T_t) - (g_0 YP_t - t_0 Y_t) \quad (1)$$

where  $g_0 = \frac{G_0}{YP_0}$  and  $t_0 = \frac{T_0}{Y_0}$

$T_t$  and  $T_0$  stand for total public revenues for year  $t$  and 0, respectively;

$G_t$  and  $G_0$  stand for total public expenditures for year  $t$  and 0, respectively;

$Y_t$  and  $Y_0$  stand for the observed products in year  $t$  and the benchmark year, respectively;

$YP_t$  and  $YP_0$  stand for the potential products in year  $t$  and the benchmark year, respectively.

Equation (1) above permits to distinguish a cyclically budget profile<sup>14</sup> allowing for effects of the cycle upon the budget, known as the “Cyclical Balance” (CB), and coinciding with the second term in the right hand side of equation (1):

$$CB_t = g_0 YP_t - t_0 Y_t \quad (2)$$

As can be noticed, public expenditures will be cyclically neutral if they change in the same proportion as the nominal potential GDP whereas more than proportional changes will be expansive, irrespective of the causes for the increase (discretionary policies, inflationary effects). More than proportional variations in revenues, with respect to the observed nominal GDP, will in turn be contractive; the CB will therefore tend to rise in recessions and to diminish during peaks of economic activity. It transpires from equation (1) that when the observed deficit is greater than the Cyclical Balance, that is a positive CNB, the fiscal action will be expansive and the opposite will stand with a negative CNB.

The appeal of the IMF’s index resides in that estimations of revenue and spending income elasticity are not required for what the process of calculus is much simpler than those of other measures. It is not however free from criticisms as the discretionary component is credited for the tax yield increase associated to fiscal progressivity; a consequence of this is that it tends to overestimate the contractive effect of fiscal policies during economic expansions, whereas the opposite occurs in recessions. Likewise, the discretionary component embodies the residual effect of automatic stabilizers, given the assumption that that revenue and spending income elasticity equal unity.

As for the second methodology (OECD’s), the structural balance permits to assess the budgetary outcome from two alternative perspectives: In the first place, as a measure of discretionary fiscal actions in absence of cyclical variations or automatic stabilizers; in the second place, the budgetary outcome may also be interpreted as an index of fiscal policy sustainability.

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Current-year tax ratio;  $r_0 = \frac{R_0}{kY_0^P}$ : Base-year tax; ratio;  $Y^P$ : Potential Output;  $k$ : Normal capacity utilization rate;

$S_t = \frac{S_t}{Y_t^P}$ : Current-year non tax revenue ratio;  $S_0 = \frac{S_0}{Y_0^P}$ : Base-year non tax revenue ratio. A complete description of the

GCEE’s methodology can be found in Federal Republic of Germany (1983), pp. 267-68.

<sup>14</sup> In determining this profile a benchmark year must be chosen, based on the sought objectives for what the index is used.



In using the OECD's methodology for assessing the impact of discretionary policies, in absence of cyclical variations, the respective cyclical components must be removed from observed actual revenue and spending levels.

In relation to tax revenues, four types can be distinguished: corporate and individuals income taxes, valued added tax and social security contributions. Public spending will only includes items related to the business cycle, for what only transfers oriented to enhancing employment are computed.

The budgetary cyclical component,  $b^{**}$ , is defined as:

$$b^{**} = b - b^* \quad (3)$$

whereas the cyclical adjusted budgetary outcome,  $b^*$ , is in turn defined as:

$$b^* = \frac{\left[ \left( \sum_{i=1}^4 T_i^* \right) - G^* + X \right]}{Y^*} \quad (4)$$

where:

$G^*$  equals the cyclically-adjusted current primary public spending,

$T_i^*$  is the cyclically-adjusted tax revenue of  $i^{th}$  category,

$X$  are not tax revenues, net of capital and interest expenses,

$Y^*$  stands for the potential output.

Cyclically-adjusted components are computed, in the case of revenues, from the ratio between the potential and actual output weighted by its elasticity and, in the case of expenses, from the ratio between the structural and observed unemployment weighted by its elasticity.

$$\frac{T_i^*}{T_i} = \left( \frac{Y^*}{Y} \right)^{\beta_{i,y}^t} ; \quad \frac{G^*}{G} = \left( \frac{U^*}{U} \right)^{\beta_{g,u}}$$

where:

$T_i$  are  $i^{th}$  category's actual tax revenues,

$G$  is the actual current public spending, net of capital and interest expenses,

$Y$  stands for the observed gross product,

$U^*$  indicates the level of structural unemployment,

$U$  indicates the actual level of unemployment,

$\beta_{i,y}^t$ :  $i^{th}$  category's elasticity of tax revenues respect of the output gap,

$\beta_{g,u}$ : current public spending elasticity respect of the ratio between the levels of structural and actual unemployment.

From the above expressions, the cyclically-adjusted budgetary outcome may be defined as:

$$b^* = \frac{\left[ \sum_{i=1}^4 T_i \left( \frac{Y^*}{Y} \right)^{\beta_{i,y}^t} - G \left( \frac{U^*}{U} \right)^{\beta_{g,u}} + X \right]}{Y^*} \quad (5)$$

whereas the cyclical component of budget will be:

$$b^{**} = \frac{1}{Y} \sum_{i=1}^4 T_i \left[ 1 - \left( \frac{Y^*}{Y} \right)^{\beta_{i,y}^t - 1} \right] - \frac{G}{Y} \left[ 1 - \left( \frac{U^*}{U} \right)^{\beta_{g,u} - 1} \right] + \frac{X}{Y} \left[ 1 - \left( \frac{Y^*}{Y} \right)^{-1} \right] \quad (6)$$

Expression (6) stresses that the cyclical component of the budgetary outcome corresponds to the cyclical components of tax revenue and current primary public spending. As observed, they are related to the output gap, the share of different tax and current spending categories in GDP and the respective elasticities.

From a conceptual stance, elasticities  $\beta_{i,y}^t$  may be split into two components:  $i^{th}$  tax elasticity respect of its tax base and the latter's elasticity respect of the output gap. The elasticity of current public spending  $\beta_{g,u}$ , is computed as the product between the elasticity of unemployment respect of the output gap and the elasticity of current public spending respect of the unemployment gap (equivalent to the proportion of current spending oriented to employment actions).

As for the estimation of elasticities for the four tax categories and the primary public spending:

#### 1) Individuals income tax and social security contributions

In this case the elasticity  $\beta_{t,y}^t$  with respect to the output gap follows from the following expression:

$$\beta_{t,y}^t = \frac{dT}{dy} \frac{y}{T} = \frac{d[(T/L)L]}{dy} \frac{y}{T} = \left( \frac{dL}{dy} \frac{y}{L} \right) \left[ 1 + \left( \frac{d[(T/L)]}{dw} \frac{w}{T/L} \right) \left( \frac{dw}{dL} \frac{L}{w} \right) \right] \quad (7)$$

in which  $y$  is the gap between the observed  $Y$  and the potential product  $Y^*$  while  $L$  and  $w$  respectively stand for employment and wage levels.

In order to estimate the elasticity of Individuals Income Tax with respect to its tax base, marginal and average rates for a representative household, for several points in the earning distribution,<sup>15</sup> must first be computed. Formally, the elasticity of income tax collection respect of incomes may be expressed as follows:

$$\beta_{tGP,earnings}^t = (\sum_{i=1}^n \gamma_i M A_i) / (\sum_{i=1}^n \gamma_i A V_i) \quad (8)$$

where:

$\gamma_i$  is share of the  $i^{th}$  decile's earnings in total earnings,

<sup>15</sup> Income distribution was drawn on the basis of information on Total Household Income, available from the Household Permanent Survey (EPH) of Argentina and setting 2006=100. The reason to use 2006 as a benchmark year was the stability observed in macroeconomic fundamentals.

$MA_i$  is the marginal income tax rate at point  $i$  over the earning distribution,<sup>16</sup>

$AV_i$  is the average income tax rate at point  $i$  over the earning distribution,

Next, the elasticity of Social Security Contributions with respect to its tax base was set equal to unity given that the Contributions have a flat rate,

The elasticity of incomes perceived by wage earners with respect to the output gap was estimated by multiplying elasticities  $a_1$  and  $b_1$ , in turn obtained from the following regressions:

$$\Delta \text{Log} \left( \frac{L_t}{L_t^*} \right) = a_0 + a_1 \Delta \text{Log} \left( \frac{Y_t}{Y_t^*} \right) + \varepsilon_t \quad (9)$$

$$\Delta \text{Log} \left( \frac{w_t L_t}{Y_t^*} \right) = b_0 + b_1 \Delta \text{Log} \left( \frac{L_t}{L_t^*} \right) + \mu_t \quad (10)$$

Thus, the elasticity of Individuals Income Tax, (7), stems from the product of expressions (8), (9) and (10);

## 2) Corporate income tax

In order to achieve the elasticity of Corporate Income Tax respect of the of the output gap  $\beta_{t_{GC}, y}^t$ , the assumption was held that the tax rate was strictly proportional since in this case cyclical variations in tax collections keep proportion with variations in the tax base (*i.e.*, firms' returns). The corresponding elasticity can then be estimated as follows:

$$\beta_{t_{GC}, y}^t = \frac{dT}{dy} \frac{y}{T} = \frac{dZ}{dy} \frac{y}{Z} \quad (11)$$

where  $y$  stands for the gap between the observed ( $Y$ ) and the potential product ( $Y^*$ ) and  $Z$  represent firms' returns.<sup>17</sup> Needless to emphasize, the proportionality assumption implies that the tax elasticity coincides with the elasticity of the tax base with respect to the output gap;

## 3) Elasticity of the value added tax

In computing the elasticity of indirect taxes, private consumption must be taken as the tax base and the following regression was resorted to:

$$\Delta \text{Log} \left( \frac{C_t}{Y_t^*} \right) = d_0 + d_1 \Delta \text{Log} \left( \frac{Y_t}{Y_t^*} \right) + \eta_t \quad (12)$$

## 4) Elasticity of current primary spending

The elasticity of primary current spending highlights the cyclical variation in expenditures devoted to enhancing employment. Owing to the assumption of proportionality between spending channeled to employment aims and unemployment, the elasticity of primary current spending equals elasticity of unemployment with respect to the output gap, weighted by the share of spending oriented to employment creation within the current primary spending; formally:

$$\beta_{g,u} = \left( \frac{dG}{dU} \right) \frac{U}{G} = \frac{UB}{G} \left( \frac{dUB}{dU} \right) \frac{U}{UB} = \frac{UB}{G} \quad (13)$$

<sup>16</sup> According to the Argentine Income Tax (Law 24621).

<sup>17</sup> In order to estimate the share of firms' return upon the observed product, the Firms' Operating Gross Surplus as percentage of gross domestic product was used.

$$\beta_{g,y} = \left( \frac{dG}{dY} \right) \frac{Y}{G} = \frac{UB}{G} \left( \frac{dUB}{dY} \right) \frac{Y}{UB} = \frac{UB}{G} \left( \frac{dU}{dY} \right) \frac{Y}{U} = \beta_{g,u} \beta_{u,y} \quad (14)$$

where:

$\beta_{g,u}$  is the elasticity of primary current spending respect of the unemployment gap,

$\beta_{g,y}$  is the elasticity of primary current spending respect of the output gap,

$G$  is the primary current spending,

$UB$  is spending oriented to enhance employment,

$U$  is unemployment's observed level.

The OECD's methodology estimates the impact of the business cycle upon the fiscal balance using indexes that capture the effect of resource utilization's degree, and the deviation between the actual and potential output and between the actual and structural unemployment. The points need be stressed that calculations are in this case subject to measurement errors related to estimations of potential output and structural unemployment.

The OECD's theoretical framework has however two deficiencies. First, and as stated in Muller P. and Price R. (1984), the cyclically-adjusted budget embraces a wide set of discretionary policy actions, including inflation-induced fiscal drag and variations in nominal debt interest payments; second, and as stressed by André and Giraud (2005), surpluses adjusted by the cycle may be influenced by temporary shocks not directly related to the cycle, including one-off operations, creative accounting, classification errors and asset price cycles.

From the perspective of an index of fiscal policy sustainability, the cyclically-adjusted balance, developed by the OECD, exhibits deficiencies owing to the impossibility of counting with precise and complete information related to all factors inducing variations in the economic activity level.

#### 4.2 Analysis of results

This section presents and analyzes results for the period 2006-09, obtained by using the methodologies developed above and aimed firstly at estimating the impact of the business cycle upon the fiscal balance and at determining the structural deficit, net of automatic stabilizers' effects (OECD's), and secondly, at assessing whether international financial crises favoured discretionary fiscal policy actions (IMF).

In seeking to determine the business cycle adjusted balance, values of the elasticity of corporate and individuals income tax, value added tax and social security contributions with respect to the output gap were estimated and shown in the following Table 1, as well as the elasticity of primary current spending with respect to the gap between observed and structural unemployment levels.<sup>18</sup>

Table 2 shows results for the balance adjusted by effect of the cycle (*i.e.*, the structural balance), this being obtained by subtracting the budgetary cyclical component from the actual levels of revenues and expenditures.

In the first place, a continuous reduction of the structural balance is easily observed as of 2006, its lowest value being reached in year 2009. Total revenues (in terms of gross domestic product) exhibited also a positive though decreasing growth rate during the period considered,

<sup>18</sup> The Hodrick-Prescott filter was used for estimating potential gross product and the structural unemployment level.

**Table 1****Argentina – Revenue and Expenditures Elasticities**

Corporate Income Tax <sup>*</sup>	1.56
Social Security Contributions	1.96
Personal Income Tax	2.72
Current Expenditures	–0.18
Value Added Tax <sup>**</sup>	1

Source: Own estimates on the basis of data from Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis of Argentina.

<sup>\*</sup> The estimation of the tax base elasticity of Corporate Income Tax through the OECD's methodology was not significant. For this reason, an alternative procedure was resorted to consisting in estimating the elasticity of Firms' Operating Gross Surplus with respect to the output gap.

<sup>\*\*</sup> The estimation of the tax base elasticity of the Value Added Tax through the OECD's methodology was not significant for what, and given that the tax has a flat rate, the elasticity value was conventionally equated to one.

**Table 2****Argentina – Actual and Cyclically-adjusted Fiscal Balance  
(percent of GDP)**

Item	2006	2007	2008	2009
Total Revenues <sup>*</sup>	21.68	24.46	26.12	27.93
Primary Public Expenditures <sup>**</sup>	14.42	21.29	22.97	26.42
Primary Surplus	7.26	3.17	3.15	1.51
Cyclical Component	–1.24	–0.52	2.07	0.17
Cyclically-adjusted Primary Surplus	8.50	3.68	1.08	1.34
Interest payments	1.76	2.03	1.73	2.14
Budget Balance	5.50	1.14	1.42	–0.63
Output Gap	0.96	0.99	1.05	1.00

Source: Own estimates on the basis of data from Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis of Argentina.

<sup>\*</sup> Total Revenues (including current revenues; transfers from ANSES, trusts and other public sector's decentralized organisms and capital revenues).

<sup>\*\*</sup> Primary Public Expenditures (prior to interest payments and including spending using transfers from ANSES, trusts and other public sector's decentralized organisms).

which can be explained by the following reasons: despite the 12.8 per cent increase in 2007, domestic problems impacted negatively in 2008 upon Value Added and Income Taxes' yield and caused in turn a contraction of tax revenues (in percent of gross domestic product). The fall was however made up with transfers from ANSES,<sup>19</sup> following the elimination of the Private Pension Fund System and with IMF' Special Draw Rights received in 2009, for what the evolution of total revenues continued to be positive during 2008 and 2009 although at lower rates (6.8 and 6.9 per cent respectively).

Second, Primary Public Spending (in terms of gross domestic product) increased 47.6 and 7.9 per cent in 2007 and 2008 respectively, due not only to the already mentioned policy of maintaining subsidies but also to a generalized increment in capital outlays which, given the performance of total revenues mentioned in the above paragraph, caused the Primary Surplus to shrink 56.3 and 0.6 per cent in 2007 and 2008, respectively.

It is worth emphasizing again that neither the 2007 and 2008

<sup>19</sup> The National Administration of Social Security.

increases in total revenues nor the increases in Primary Public Spending resulted from government's discretionary fiscal actions to countervail the effects of the international financial crises but rather to the political commitment of maintaining, via ever increasing budgetary subsidies, the freezing imposed on tariffs of public services and utilities (transport, electricity, gas and combustibles). As a consequence, Primary Public Spending (in terms of GDP) underwent an increase of 15 per cent during 2009 and the Primary Surplus (also in terms of GDP) suffered a substantial reduction of 52 per cent compared to its 2008 figure; at the same time, and owing to a substantial 23.4 per cent increase in interest payments, the Financial Budget Surplus also showed a marked reduction in 2009.

Reasons for the continuous declining of the structural superavit have to be sought at the observed superavit's decreasing evolution, in turn due to the lesser relative importance of the automatic stabilizers' role. This is visible from the output gap evolution that gradually converged to unity.

In particular, the 52 per cent reduction in the 2009 observed fiscal superavit, accompanied by the performance of automatic stabilizers (*i.e.*, cyclical component), which experienced a 91.7 per cent contraction in 2009, allowed the structural superavit to rise from 1.08 to 1.34 per cent points of gross domestic product in 2008 and 2009, respectively (24 per cent). The above numerical conclusion implies that to the extent that the economic activity level converges towards its potential level, the observed budgetary balance tends to equal its structural level.

In conclusion, the analysis of results obtained using the methodology by Girouard and André (OCDE) suggests that the main explanation for the weakness of the structural balance lies in the discretionary performance of fiscal actions used to deal with problems arising from the unsolved domestic economic situations.

Next, and in order to carry out a deeper analysis of the possible discretionary orientation of fiscal policy the second methodology, due to the IMF, was resorted to and the results for the period 2006-09<sup>20</sup> are presented in ensuing the Table 3.

As previously described, fiscal policy was expansive in 2007 and 2009 which explains the observed reduction in the Primary Surplus, whose lower level was reached in 2009. There was however some countervailing fiscal policy during 2009, aimed at checking increased unemployment stemming from lower activity levels in industrial sectors facing both a shrink in exports due to the fall in the world demand and bottlenecks due to investment shortage. The assumedly government's discretionary response to world conditions amounted to 1.56 percentage point of GDP and was only limited to the spending side of the budget, as they consisted mainly of programs seeking to enhance social contention<sup>21</sup> and to check extreme poverty, as well as to finance infrastructure investment.<sup>22</sup>

Table 4, showing the structure of Current and Capital Transfers in 2009, serves the purpose of highlighting those discretionary fiscal actions that led to the marked decline of fiscal budget in that year. Current transfers exhibited an inter-annual increase of 0.97 percentage points of GDP, 50 per cent of which can be explained by additional transfers channeled to firms' financial assistance and trust funds and employment enhancing actions and social public spending, whereas 20, 17.6 and 12.4 per cent respectively went to household grants, financial assistance to

<sup>20</sup> For obtaining the indexes, the budgetary balance was defined as "surplus" and not as "deficit".

<sup>21</sup> See footnote 12.

<sup>22</sup> Let the fact be noticed that that Argentina exclusively resorted to spending discretionary fiscal policies, and not to discretionary tax measures and that the size of measures amounted to a modest percentage of GDP, as was also stressed by international organisms. See in this connection IMF (2009), Table 4 (G-20 Estimative Costs of Discretionary Measures 2008-10) and Table 5 (G-20 Stimulus Measures 2008-10).

Table 3

**Argentina – Evolution of the Budget Balance**  
(percent of GDP)

Item	2006	2007	2008	2009
Total Revenues*	21.68	24.46	26.12	27.93
Primary Public Expenditures**	14.42	21.29	22.97	26.42
Primary Surplus	7.26	3.17	3.15	1.51
Cyclical Component	3.10	7.17	3.07	3.07
Cyclically-neutral Budget	4.16	-4.00	0.08	-1.56
Interest payments	1.76	2.03	1.73	2.14
Budget Balance	5.50	1.14	1.42	-0.63

Source: Own estimates on the basis of data from Secretary of Economic Policy, the National Bureau of Investigation and Fiscal Analysis and the Economic Commission for Latin America and the Caribbean.

\* Total Revenues (including current revenues; transfers from ANSES, trusts and other public sector's decentralized organisms and capital revenues).

\*\* Primary Public Expenditures (prior to interest payments and including spending using transfers from ANSES, trusts and other public sector's decentralized organisms).

Table 4

**Argentina – 2009's Discretionary Fiscal Actions**

Item	Absolute Increment (millions of current pesos)	Absolute Increment (percent of GDP)
<b>Current Transfers</b>	14,803.80	1.29
- Transfers to Universities	2,474.80	0.22
- Budgetary Transfers to Aerolineas Argentinas	1,235.40	0.11
- Transfers to External Sector	24.1	0.00
<b>Net Current Transfers</b>	11,093.60	0.97
<b>Capital Transfers</b>	6,451.90	0.56
<b>Total Transfers</b>	17,545.50	1.53

Source: On the basis of data from the Budget National Bureau of Argentina.

provinces and the social security system. On the other side, social public expenditure and Infrastructure Investment in turn accounted for 90 per cent of the increase in capital transfers (0.56 percentage points of GDP compared to the previous year's figure). In all, figures show that the overall observed fiscal stimulus rose to 1.53 percentage points of gross domestic product.

Table 5

**Argentina – Overall Cyclical Responsiveness of the Budget**

Parameter	2006	2007	2008	2009
Corporate Income Tax	5.20%	5.30%	5.00%	4.50%
Personal Income Tax	4.10%	4.30%	4.60%	4.60%
Value Added Tax	7.20%	7.70%	7.80%	7.60%
Social Security Contributions	7.40%	8.80%	10.00%	13.20%
Current Expenditures	−0.02%	−0.03%	−0.03%	−0.04%
Cyclical sensitivity of Tax Revenues	23.90%	26.20%	27.40%	29.90%
Overall cyclical responsiveness of the budget	24.00%	26.20%	27.40%	30.00%

Source: Own estimates on the basis of data from Secretary of Economic Policy and the National Bureau of Investigation and Fiscal Analysis of Argentina.

Was the Argentine fiscal stimulus appropriate in size? Or did it fall short of required by the prevailing economic conditions in the period considered? In conceptually dealing with the matter, Uxó and Salinas (2009), stressed that the size of the required discretionary fiscal stimulus varies in function of several elements such as the actual demand contraction, automatic stabilizers' effectiveness and the efficacy of fiscal actions used to impact upon the product; thus, the necessary fiscal discretionary stimulus will be greater the larger the economy's output gap, the weaker the performance of automatic stabilizers and the lesser the size of fiscal policy multipliers.

The quotient between the deficit increase and the output gap, used to estimating the size of the necessary fiscal stimulus, rendered for 2009 a value of 0.52 percentage points of the output gap. This result is wholly explained by the fall of the primary surplus in that year, period in which the Argentine GDP approached its structural level. From a different angle, if attention is rather focused on exceptional fiscal measures taken to deal with crises, an alternative procedure is also at hand consisting in taking the quotient between the size of discretionary actions (in percents of the actual GDP) and the output gap, which renders a value of 1.56 percentage points of the output gap.

In seeking to complete the analysis of the structural balance performance, the overall cyclical sensitivity of the budget to the economic cycle, measured by the semi-elasticity of the budget balance (as a percent of GDP) with respect to the output gap,<sup>23</sup> is achieved. According to results from Table 5, the overall cyclical sensitivity has risen during the last four years from 24 per cent in 2006 to 30 per cent in 2009. In the last year, the increase in the effectiveness of the overall sensitivity of the budget can be explained by the elimination of the Private Pension Fund System, which caused the increment in Social Security revenues; the latter gives support to the idea that, in Argentina, automatic stabilizers do not suffice to check cyclical perturbations in isolation and discretionary fiscal policies must always accompany stabilizing actions.

Furthermore, the low Corporate Income Tax's cyclical sensitivity (5.2-5.3 per cent in 2006-07 and 5-4.5 per cent in 2008-09) does not come as a surprise as its tax yield stems basically from firms subject to flat tax rates, and not from individuals subject to progressive tax rates; also, a discretionary tax spending increase, whose effect was to reduce the income elasticity of the tax in

<sup>23</sup> It is defined as the difference between the cyclical sensitivity of the four categories of taxes and the one expenditure item, weighted by their respective shares in GDP.



2009, helped in turn to reduce income taxation's stabilizing power. Nevertheless, the built-in flexibility of the Individual Income Tax slightly rose from a value of 4.1 per cent in 2006 to 4.6 per cent in 2009, due to the increasing share of its revenue in GDP.

As Rezk (1982) already asserted after reviewing VAT's implementation in the country, the automatic stabilizing function the theory traditionally assigned to Individuals Income Taxes was in Argentina mainly assumed by the Value Added Tax, as percentages from Table 5 indicate. Notwithstanding the mentioned feature, VAT's stabilizing power was seen to increase from 7.2 per cent in 2006 to 7.8 per cent in 2008, due to the increase in the share of its revenue in GDP; however, the cyclical sensitivity of the VAT diminished in 2009 following the occurrence of lower economic activity levels.

In sum, it can be concluded from the application of the IMF's that the Argentine structural deficit's performance in the period 2006-09 mainly responded to the discretionary bias of the fiscal policy, whose main focus resided in poverty-checking and employment enhancement current public expenditures and infrastructure capital outlays. It is worth pointing out in this connection that the loss of automatic stabilizers' relevance can be explained not only for their actual low effectiveness but mainly for the convergence of the economic activity towards its structural level.

## **5 Conclusions**

1. Although international crises in part accounted for the recent weak Argentine economic performance, main causes for the latter have to be sought in domestic economic policies in so far they added uncertainty to the decision process of economic sectors. In this connection, the negative impact of international crises acted in Argentina intertwined with domestically unsolved policy problems that sometimes outweighed and amplified the former's effects.

2. The negative impact of the international crises upon the balance of trade was only relatively felt by domestic manufacturing sectors in reason of Argentina's membership to the regional economic integration known as MERCOSUR. Whatever negative effects arising from NAFTA – as of 2007 – and European countries in 2008, were compensated by the increased exports to Brazil. Apart from the loss of markets abroad due to the crisis, industrial production levels were also damaged by the sluggish rate of growth of private investment, due to the profit loss of firms.

3. The exports of agroindustrial goods and of agricultural commodities fell in 2009 when the consequences of the domestic problems (export bans and tax rate increases) began to be felt. The main negative effects of international crisis were visible with respect to China (one of Argentina's single most important customers).

4. Total government revenues (in terms of GDP) exhibited a positive, though decreasing, growth rate during the period considered, which can be explained by the following reasons: despite the 12.8 per cent increase in 2007, domestic problems impacted negatively in 2008 upon Value Added and Income Taxes' yield and caused in turn a contraction of tax revenues (in percent of gross domestic product), in spite of the rise in transfers received from ANSES, stemming from the eliminated Private Pension Fund System, and of IMF's special draw rights received in 2009.

5. An stagnated growth rate and local firms' lesser returns, were the major causes of the tax revenue shrinking, specially in Corporate Income Tax.

6. Primary Public Spending (in terms of GDP) increased 47.6 and 7.9 per cent in 2007 and 2008 respectively. The increase in Primary Public Expenditures in 2008 did not respond to government's discretionary fiscal actions to countervail the effects of the international financial crises but rather to the policy decision of maintaining subsidies and continuing the freezing imposed on tariffs of public services and utilities, but also to a generalized increment in capital

outlays which, given the performance of total revenues, caused the Primary Surplus to shrink 56.3 and 0.6 per cent in 2007 and 2008, respectively.

7. In explaining the Argentine federal government's fiscal strain, the emphasis must be placed in current public spending rather than in revenues since it results evident that the former's rate of growth did not keep pace but outweighed that of public current revenues. The present Argentine fiscal weakness which suggests, even ruling out effects of international crises, that the actual level of primary surplus mostly responds to exceptional revenue flows (as the special drawing rights) and to discretionary actions such as the seizing of the private individual capitalization regime occurred in 2009.

8. Fiscal policy was expansive in 2007 and 2009 which explains the observed reduction in the Primary Surplus, whose lower level was reached in 2009, amounting to 1.56 percentage point of GDP of government's discretionary response to world conditions. On the other side, the observed fiscal stimulus rose to 1.53 percentage points of GDP, which was only limited to the spending side of the budget, as they consisted mainly of programs seeking to enhance social contention and to check extreme poverty, as well as to finance infrastructure investment.

9. The overall cyclical sensitivity of total tax revenue has been increasing and stabilized around 30 per cent in 2009. However, the response of the budget balance to the GDP did not suffice to check cyclical perturbations, for this reason discretionary fiscal policies had to somehow accompany stabilizing actions.

## APPENDIX

**Effect of the output gap on employment, 1994: IV-2008: I**

Dependent Variable: DLOG(WORK)

Method: Least Squares

Included observations: 54 after adjustments

**DLOG(WORK)=C(1)+C(2)\*DLOG(GAP)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	9.45E <sup>-13</sup>	3.63E <sup>-11</sup>	0.02605	0.97931753
C(2)	1.00E <sup>+00</sup>	4.26E <sup>-10</sup>	2349215837.483	0
R-squared	1.00E <sup>+00</sup>	Mean dependent var.		0.001
Adjusted R-squared	1	S.D. dependent var.		0.086
S.E. of regression	2.67E <sup>-10</sup>	Akaike info criterion		-41.216
Sum squared resid	3.70E <sup>-18</sup>	Schwarz criterion		-41.142
Log likelihood	1114.824	Hannan-Quinn criterion		-41.187
F-statistic	5.52E <sup>+18</sup>	Durbin-Watson statistic		2.887
Prob(F-statistic)	0			

**Effect of employment on wages, 1994: IV-2008: I**

Dependent Variable: DLOG(WAGE)

Method: Least Squares

Included observations: 54 after adjustments

**DLOG(WAGE)=C(1)+C(2)\*DLOG(WORK)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.01834	0.01468	1.24897	0.21726765
C(2)	0.96388	0.17220	5.59734	8.26E-07
R-squared	0.3760	Mean dependent var.		0.01915
Adjusted R-squared	0.3640	S.D. dependent var.		0.13528
S.E. of regression	0.1079	Akaike info criterion		-1.58E+00
Sum squared resid	0.6052	Schwarz criterion		-1.5055031
Log likelihood	44.6376	Hannan-Quinn criterion		-1.55E+00
F-statistic	31.3302	Durbin-Watson statistic		2.94E+00
Prob(F-statistic)	8.26E <sup>-07</sup>			

**Summary of elasticities**

Employment Elasticity of Wages	0.96
Output Elasticity of Employment	1
Elasticity of Corporate Income Tax	1.56
Elasticity of Social Security Contribution	1.96
Elasticity of Personal Income Tax	2.7244
Elasticity of Total Income Tax	0.9113157
Elasticity on Unemployment with Respect to the Output Gap	-4.3996771
Share of Unemployment-related Expenditures with Respect to the Output Gap	0.04100992
Elasticity of Current Primary Expenditure	-0.1804304

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## COMMENTS ON SESSION 1 AUTOMATIC STABILISERS AND DISCRETIONARY FISCAL POLICY

*Adi Brender\**

### 1 Key analytical issues for policy choice and design

A basic question facing policy makers at the outset of a crisis is to accurately portray the economy's position at the crisis outset. Such a characterization is essential to avoid overreaction and to calculate the costs of the intervention in light of the country's medium and long-term needs and risks. Two key components of such analysis are the evaluation of the output gap and of the economy's "trend" growth. It is quite possible, and in the case of the current crisis very likely, that many economies operated above capacity in the years preceding the crisis, and that estimates of trend growth based on performance during these years are exaggerated. If this is the case, policies should not aim at reaching the same trend growth in the years to come, nor should they count on a return to the level of tax revenues that was associated with this output level. Moreover, tax revenues in many countries also included a substantial component that was associated with the unsustainable developments in the capital and real-estate markets, and such excesses should not be part of the expected long-term revenues.

Once the economy's position at the outset is understood, another challenging task is to properly characterize the source of the shock – demand or supply. This stage is critical in forming the appropriate policy response. It is also essential to identify whether the shock is cyclical or permanent and how it is understood by the markets. It is likely that the effectiveness of an expansionary fiscal policy will be affected by the markets' evaluation of the policy's sustainability, which depends on whether the shock is perceived to be permanent or temporary. While in the first case offsetting Ricardian considerations may show up as well as an increase in the country's risk premium, in the latter case these effects are less likely to constrain the fiscal strategy.

Once the economic environment and the shock have been characterized, policy-makers are faced with the task of identifying and choosing the required policy measures. This choice depends on several considerations, not all of which will necessarily lead to the same composition of measures:

- **Intervene beyond the automatic stabilizers?** In most countries the operation of the automatic stabilizers moderated the decline of economic activity at times of crisis, but at a cost of increasing the public debt. An important decision for the government is whether to settle for this effect or add discretionary measures to further support economic activity.
- **When to act?** If a government considers discretionary intervention, a key question is when to intervene. An early intervention has the advantage of tackling the recession soon and possibly preventing deterioration. In contrast, a delayed response provides scope to avoid unnecessary interventions, and their associated costs and distortions, in short recessions where the economy – helped by the automatic stabilizers – may recover on its own.
- **What is effective?** Some policy measures that work well in one country in one period may not lead to the desired results in other circumstances. For example, construction projects may work well where planning procedures are quick, land is available and employment in this sector is predominantly by locals. In contrast, it may not work where foreign workers fill most of the jobs in this sector.

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\* Bank of Israel.

- **What causes the smallest long-run damage?** Interventions during a crisis may have significant negative long-run effects. These may be due to public debt accumulation, distorted incentives in the case of transfer payments, or moral hazard where business support and rescue operations are activated.
- **Market information:** One important feature that governments have to consider when operating during a crisis is that information derived from the markets may be less indicative than in normal times. The recent crisis and the preceding period were characterized by the departure of asset prices, project evaluations and risk assessments from “sensible” values. While these market perceptions are still relevant in certain aspects (e.g., whether “correct” or not, they influence the cost of government borrowing), governments may need the “courage” to decide that the markets are “wrong” and intervene based on their own (preferably well justified) assessments.

## 2 What have we learned in the current crisis?

While there are many analytical considerations in implementing fiscal policy during a crisis, the development of the current crisis has demonstrated that, in practice, policy decisions have to be taken in “real-time” with a high degree of uncertainty. Policy makers in the height of a crisis do not usually pose the required information and analysis, so decisions need to be based on a “balance of risks”, not on “solid” data. In the current crisis it was particularly evident that the existing analytical tools were inaccurate, as emphasized by Fischer and Justo above: *“in this juncture the estimates of the cyclical budget component are possibly more uncertain than ever, given the difficulty in knowing what are really the representative output gap as well as budgetary sensitivity to the cycle”*.

An important lesson that should be drawn from this realization is that given the sharp changes of what we thought we knew about 2009, it would be hasty to base decisions on what we think we know about 2060, the current target year for long-term fiscal frameworks (which changed a lot too). Another lesson that can be drawn from the developments that led to the crisis is that – just like in the financial markets – there is always a new “story” for good old fiscal expansions. To contain this risk, fiscal economists should keep models simple and based on long-run **past** developments. We should remind ourselves constantly that the fundamentals of the economy change less frequently than might be suggested by analyses based on the “last observation”. The principle of keeping our models simple and transparent should be especially adhered to in setting fiscal rules.

The current crisis poses even more difficulties to policy makers than a normal recession during the business cycle. First, this crisis is global, meaning that it is more difficult to “push” the problem away to other countries. Policies that usually work by enhancing competitiveness and raising net exports were less likely to work when trading partners are hit simultaneously. Second, the risk of financial collapse demanded – in some countries – significant fiscal resources that gave rise to potential Ricardian considerations with little impact on real activity (compared to normal periods, not to the counterfactual of not saving the financial institutions). Finally, the size of the shock and of the required intervention to make an impact were simply too big to ignore “fairness” issues; implying a larger cost of the intervention in order to spread the help beyond the segments of society that were directly affected by the crisis.

In such a crisis the balance of risks tilts clearly in favor of fiscal intervention to avoid the “liquidity trap” and significant hysteresis effects, even at the cost of future adjustments. The two papers I discuss below deal with the question of “how to intervene”, rather than “whether to intervene”, which, in the current crisis, is the more relevant and useful analysis. Specifically,



Bouthevillain and Dufrenot compare the size of multipliers in recessions and “normal” times and point out which measures are more effective in each, and Fischer and Justo provide detailed data on the measures that European governments implemented during the current crisis and classify them according to various criteria.

### 3 Comments on “Are the Effects of Fiscal Changes Different in Times of Crisis and Non-crisis? – The French Case” by Carine Bouthevillain and Gilles Dufrenot

The paper examines the differences in the effectiveness of policy measures in recessions, compared to “normal” times. While this is an interesting question in general, it is less relevant to the current crisis which is not a “regular” recession. Accordingly, the relevant question is non-linearity in the effectiveness of various measures during recessions, not differences between recessions and “normal” times. While the authors do allow the data to decide where the breaking points are, with the potential that these breaking points will separate large crises from all other periods, the sample does not contain enough data points with “serious” recessions, as evident from the average growth rates in the periods classified by the model as “recession”; such an analysis would probably require a panel of quite a few countries. Moreover, limiting the number of “regimes” to 2, significantly reduces the probability that the periods identifies as “recession regime” will provide a relevant parameterization for the effectiveness of policy measures in a crisis like the current one.<sup>1</sup>

A second important caveat of the paper is the selection of the variables: there is too much “data mining” instead of analytical reasoning in the choice of the RHS variables. As discussed above, this type of modeling may lead eventually to results that place too much weight on “what works”, rather than on “what makes sense”, precisely the type of modeling associated with the policy misconceptions preceding the crisis. This process of choosing the variables is reflected, *inter alia*, in the non-intuitive lag structure in some equations – even if AIC supports them. Additionally, the regime-switching methodology should also control for changes in the political arena that may affect fiscal policies. While the analysis is definitely in the domain of legitimate academic and analytical analysis, jumping from it to policy prescriptions should be done with extreme caution.

In terms of Model Specification, the chosen explanatory variables: change in openness, short-term interest rates, the shares of public expenditure and revenues in GDP, do not seem to be the best candidates to explain changes in growth. More appropriate variables would be, for example, the change in world trade, Investment in the previous period, the growth rate of the population at ages 25-64, and changes in tax rates. Moreover, in dealing with issues of Ricardian effects, the key relevant variables are those that reflect long-term perceptions – which indicate future taxation – and not cyclical increases in public debt. In order to account for those, the model needs to use variables such as a persistent rise of debt, cyclically adjusted fiscal variables and debt levels. Again, using such variables would probably be easier in a multi-country panel, which seems to be the more appropriate empirical setting for the studied question. This is particularly relevant because **the available fiscal data are not really quarterly** – the quarterly fiscal figures are interpolated from annual data – a key problem in identifying the true fiscal response in quarterly estimation.

Another issue related to model specification is that when the output gap is small or negative, fiscal expansions lead to inflation – not to growth. This may bias the results towards not finding an effect of fiscal expansion on real GDP growth in such periods. Accordingly, there is a need to

<sup>1</sup> A disturbing feature of the methodology is that periods are classified differently in each equation.

control in some form for the output gap or, more specifically, for the interaction of the output gap with fiscal policy. This bias is particularly important in the current setting of the estimation which allows only two “states of the world” and “forces” a single coefficient for all the periods that are not a “recession”.

The analysis in the paper, especially with respect to potential Ricardian effects could benefit from separating endogenous developments from discrete measures. As mentioned above, Ricardian effects should result predominantly from permanent (discrete) measures, while cyclical developments should be associated with them to a much lesser extent. For example, if transfers rise (relative to GDP) during a growth period, this increase is likely to reflect legislation; in a recession it is probably an endogenous response. The opposite is probably true for taxes. Without, at least, such a basic analysis, the scope for useful analysis of Ricardian effects is fairly limited, and seems to be overdone in the paper. Without this analysis the interpretation of the coefficients in general is also hampered.

The policy implications derived from the results suggests that expansionary fiscal policy – either raising expenditure or cutting taxes – is effective in times of recession. Moreover, the authors also find that in non-recession periods cutting expenditures will moderate growth by a lesser degree (if at all, according to Table 1b) than the acceleration achieved during the recession,<sup>2</sup> and that raising taxes in non-recession periods does not affect growth. Hence, the results indicate a permanent gain in the level of GDP from countercyclical fiscal adjustments. I find this result to suggest, predominantly, that further work is needed to strengthen and examine the paper’s empirical findings.

The investment and employment equations provide more depth for the analysis, but essentially also carry the same basic problems as the growth equations. I would not repeat those. However, the fact that the methodology identifies different periods as a recession in each equation undermines the benefit from this expansion. As for the specific findings, it is worth noting that the results suggest that the effect of subsidies on investment is with a lag of 2 quarters, meaning that measures implemented during recessions – allowing for some lag between the recognition of the crisis and policy implementation – typically affect performance when the economy already begins to recover. Again, there is no offsetting effect when these subsidies are removed as the economy emerges out of the recession. As for the private employment equations, it should be better explained why lagged public investment has a negative effect on private employment (in regime 2), and the reversed sign of unit labor costs. Such findings are more indicative of endogeneity problems in the estimation rather than the behavior of the economy.

#### **4 Comments on “Government Fiscal and Real Economy Responses to the Crises: Automatic Stabilisers Versus Automatic Stabilisation” by Jonas Fischer and Isabelle Justo**

Fischer and Justo constructed a very useful dataset on the policy measures adopted by EU members in the current crisis. This dataset is useful and will probably serve many future studies and policy discussions. Moreover, given the uniqueness of the current crisis, the approach adopted in this paper – to examine the developments in a cross-section setting rather than in time-series – is indeed the more appropriate one. Nevertheless, as an independent study this paper is a miss, because it provides too little analysis. The key feature absent in their work is a greater focus on the cross-section variability rather than on averages for the sample. Since the authors do a thorough job in collecting and describing the data on the policy measures, I will focus my comments on

<sup>2</sup> The authors highlight this result, although they do not provide a test whether it is statistically significant.

suggestions for more ambitious analysis that could be implemented by the authors – sort of a “wish list”.

In terms of the descriptive data, the authors could compare the size of measures in various policy areas to the initial level of expenditure. In some fields the addition to public expenditure during the crisis was small in absolute terms but significant compared to the base. This may provide an indication for the potential capacity limitations facing policy-makers when they want to target certain activities or fields of activity.

To enhance the analytical value of the paper the authors could present a breakdown of the policy measures taken by the country’s fiscal position at the outset of the crisis and the required long-term fiscal adjustment, and according to the size of government relative to GDP. It would also be interesting to show a descriptive analysis of the relationship between the types of measures adopted and labor market conditions, the relation between the size of discrete policy measures and the need for financial sector support, and the effect of initial country risk on the intervention’s magnitude and the selection of instruments. Furthermore, it would be useful to examine if discretionary interventions tended to complement the automatic stabilizers to a given absolute size, or whether the two types of fiscal expansions are positively correlated.

As for more ambitious in-depth analysis, it would be valuable to study the effectiveness of automatic stabilizers and discretionary measures with long-term regressions, or simulate coefficients taken from other studies, and compare the projected elasticities with those in the current crisis. The key question that would be particularly interesting in the current study is whether the measures that were chosen in the recent crisis are those that were found to be effective in the past, and whether different past country experiences affected the recent composition of policy instruments. While these questions definitely go beyond the current scope of the paper, much of the relevant raw information is already presented in the paper, and the added examination would substantially upgrade the analysis.



## COMMENTS ON SESSION 1 AUTOMATIC STABILISERS AND DISCRETIONARY FISCAL POLICY

*Geert Langenus\**

Let me start by thanking the organisers for inviting me and giving me the opportunity to discuss two excellent papers, the one by Ludger Schuknecht on “Fiscal Activism in Booms, Busts and Beyond” and the one by Britta Hamburg *et al.* comparing the fiscal policy reaction to the recession in Germany and Italy. The tone and the messages of both papers are quite different. Ludger is essentially telling us that policy mistakes have been made both in the run-up to and during the crisis while the second paper argues that the Italian and German government have all in all done a good job as they have successfully limited the drop in output in a relatively similar and efficient manner. So, clearly there is a difference in views there. What both papers agree upon, though, is that the time has now come to face the challenge of designing and implementing a coherent fiscal exit strategy, although I also sensed a greater urgency in Ludger’s paper and presentation than in the paper by the colleagues of the Deutsche Bundesbank and the Banca d’Italia.

Let me treat both papers in chronological order and start with the one by Ludger Schuknecht. In my view, this paper offers an excellent descriptive analysis of the policies before and during the Great 2008-09 Recession. Fiscal – but also other – policies were overly imprudent in good times. This was partially obscured by the problems in measuring output gaps and structural fiscal positions in real time (and, more in particular, an overestimation of the growth outlook) and compounded by unsustainable private-sector developments leading to macroeconomic imbalances. Then, when the recession hit, there was a panic reaction and governments all over the world rediscovered the alleged virtues of “old skool” Keynesiansm, which substantially aggravated already existing fiscal sustainability problems. Now the issue is to implement fiscal consolidation strategies in a timely manner with a view to bringing public finances closer to a sustainable path and expenditure retrenchment should – for a number of reasons – be a key ingredient of those strategies.

I reckon that, if economic historians look back upon the current episode in fifty years’ time or so, this is more or less the story that they will come up with. Of course, Ludger’s great merit is that he writes this today, rather than 50 years from now, when the dust has far from settled and opinions on what governments should and should not do still diverge quite a lot (including, e.g., calls from leading policy analysts to address government debt problems by creating more inflation).

I would argue that this paper is vintage Schuknecht: it presents a logical sequence of arguments, specifically highlighting where policy mistakes have been made and, obviously, it ends with a call to substantially reduce government expenditure ratios! The thing is, it is really hard to find fault with the reasoning and, to be honest, I am not going to try very hard. I realise that I am not doing my job as discussant very well but what I would like to do instead is to offer some general comments that will mostly corroborate or add to the story.

Let me start with the measurement issue. The paper reminds us again about the difficulties involved in gauging the structural component of the budget balances, especially in times of strong cyclical fluctuations. In this connection, there are three possible reactions. First, one can stop using these indicators altogether. However, it is obviously highly doubtful whether nominal budget balances will prove to be a more reliable compass for fiscal analysis. Second, one can try to further

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The views expressed here are those of the author and not necessarily those of the National Bank of Belgium.

improve the methods used for the cyclical adjustment of budget balances (by, e.g., explicitly accounting for asset price cycles) but there is a clear risk of “overburdening” the indicator. Finally, one may interpret structural balance estimates with (greater) caution. In this connection, it may be worthwhile to focus more on methods that help to *explain*, rather than just gauge movements in structural balances as they can point to windfalls or shortfalls that can not be traced back to policy actions or structural elements. However, as long as one accepts that the current assessment of the cyclical position to some extent depends on projected future developments – and, to my mind, this is the only viable approach from an intellectual point of view –, estimates of structural balances will continue to come with at least some degree of uncertainty. In addition, one should not forget that a more serious problem, that is not explicitly addressed in the paper, is the apparent general unreliability of the actual government accounts for certain countries. To my mind, structural reforms are also warranted in the area of government finance statistics both at the national level in certain countries, but most likely also at the level of Eurostat. In the recent past and in part due to limitations in terms of its mandate, the latter institution has not always been the “rapid statistical reaction force” that fiscal analysts would want.

My second general comment pertains to the fact that quite a few of the elements in the cocktail that according to Ludger led up to the recent recession and the very worrisome public finance situation were actually well-known: fiscal analysts have repeatedly warned that buoyant expenditure trends and, more generally, a post-Maastricht “fiscal fatigue” were weakening the budgetary fundamentals and making government budgets more vulnerable to adverse shocks. The fact that substantial revenue windfalls are not always captured by traditional cyclical adjustment methods and, hence, estimates of structural budget balances may offer a false sense of comfort, has been documented many times, not least by Ludger himself. It seems fair to say that there was no shortage of warnings against unsustainable fiscal – but also macroeconomic – developments. Actually, in some ways, the current episode even looks like a more spectacular remake – with, granted, a starring role for a new villain, the financial sector – of the fiscal crisis at the beginning of the decade when the euro area and the EU fiscal framework were hit by the first wave of excessive deficits. It would appear that, while the writing may have been on the wall, the font was apparently not clear or big enough for governments to start following the path of activist prudence recommended by Ludger. Against this background, a solid case can in my view be made for strengthening the (supra-national) regulatory and institutional framework for public finances.

In this connection, the current crisis provides an ideal opportunity to rethink the design but especially the implementation of the EU fiscal rules. If the latter are to contribute to preventing the emergence of huge fiscal imbalances, then, clearly, more attention should be paid to sound fiscal positions in the medium and the longer term. This implies in my view that the so-called preventive procedures of the Stability and Growth Pact, that are anchored to the achievement of sound medium-term objectives for public finances, should become truly binding. In addition, one should carefully consider whether the new approach to defining these medium-term objectives will be sufficiently prudent, especially when taking into account the longer-term fiscal challenges related to population ageing. As regards the corrective procedures of the Pact, it may be appropriate to turn back some of the “flexibility” that was introduced in EU fiscal rules when the Pact was reformed in 2005. Turning to the national fiscal frameworks, it seems obvious that national rules can be a useful complement to the Stability and Growth Pact. However, certain countries may also explore the scope for (further) delegating specific aspects of budgetary policy to independent fiscal councils. In this respect, the elaboration of prudent macroeconomic and government revenue assumptions for the budget is an example that comes to mind. More generally, the crisis has also clearly shown that a much broader assessment of fiscal risks is warranted: rather than just focusing on budget balances, one should pay greater attention to public debt developments, implicit liabilities and macroeconomic imbalances. I would argue that the Stability and Growth Pact was the main victim

of the fiscal slippage as of 2001. It would be somewhat ironic, but certainly very welcome, if the more dramatic fiscal problems that we experience today would lead to tougher EU fiscal rules...

Finally, as any story about the Great Recession 2008-09, also Ludger's paper contains a chapter about the financial institutions and the government support measures to keep some important ones afloat. What always strikes me, is that fiscal analysts, including the ones that tend to be rather critical of interventionist policies, are typically more hesitant to criticise the measures taken to support ailing financial institutions. Even Ludger, whom nobody will accuse of having the habit of turning a blind eye on policy mistakes, indicates that these measures "can probably be called rather successful". This generally more lenient attitude is probably related to the fact that the absence of any intervention could have triggered a financial meltdown and a much deeper or longer recession. Still, in retrospect one can ask whether tax money has been used wisely in all bank rescue operations, in particular as a perceived "fiscal largesse" for the banking sector at least represents a communication challenge in times when draconian consolidation measures appear necessary for many countries. In my view a number of parallels can be drawn with the story about the real economy that go beyond the obvious lack of prudence in good times. First, I could think of a number of cases where panic-driven government actions have clearly led to second-best solutions. Second, as with the Keynesian demand management, it does not seem outrageous to think that also the fiscal support measures for the banking sector have sometimes been captured by special interests.

I turn now to the second paper that I will discuss, the excellent empirical assessment of the fiscal reaction in Italy and Germany that was presented by Sandro Momigliano. The paper makes a couple of very interesting points. First, appearances can be deceiving: the authors argue that, all in all, fiscal policy was loosened to a roughly similar extent in both countries despite the alleged different size of the "stimulus measures". Second, their simulations suggest that this fiscal reaction salvaged some 1 percent of 2009 GDP in Italy and some 2 per cent of 2009 GDP in Germany. The different impact is attributed to country differences in fiscal multipliers; in this connection, the growth contribution of Italian automatic stabilisers is surprisingly low to my mind. Finally, they also present a "neutral" benchmark simulation showing what would have been the outcome in the absence of any policy reaction and an earlier version of the paper that I read, suggested that a comparison with this benchmark showed that the policy reaction may have been relatively efficient. My comments will generally focus on how to assess – the efficiency and, more generally, the appropriateness of – a government's fiscal reaction.

The first issue in this respect is the correct measurement of this fiscal reaction. One of the things that I like very much about the Hamburg et al. paper is the fact that it clearly shows that there is a significant gap between the "bottom-up" and the "top-down" approach, *i.e.* between a measurement based on the adding up of individual stimulus measures and one anchored to the change in structural (primary) budget balances. As indicated in the paper, the bottom-up approach is biased by differences in budgetary (*i.e.* mostly expenditure) trends as well as political economy issues: governments may have reasons to misrepresent actual stimulus efforts. While the top-down approach, on the other hand, may be affected by the measurement problems related to the real-time assessment of the cyclical situation and referred to in Ludger Schuknecht's paper, it would still seem to be a more reliable yardstick to gauge policy intervention in my view. However, it is crucially important to try to identify the sources of the gap between these two approaches to get a deeper understanding of the orientation of fiscal policy. At any rate, the paper also clearly shows the need to look at explicit policy action and automatic stabilisers together.

Turning to the measurement of the fiscal impact, this paper uses the macroeconometric models of the Banca d'Italia and the Deutsche Bundesbank. I am certainly not in position to quarrel with the modelers of these two institutions but such models obviously tend to reflect *average* behaviour. In this connection, it should be stressed that appendix A suggests that both models are

basically of the Keynesian type in the short run. Hence, we should probably not expect the empirical results to point to negative, or even small, fiscal multipliers. However, several studies show that fiscal multipliers may be regime-dependent. This is the case for the paper by Bouthevillain and Dufrénot that was presented here in the same session but, e.g., also for Tagkalakis (2008) and Nickel and Vansteenkiste (2008). Against this background, the million-dollar question is to what extent the current exceptional circumstances change the “normal” fiscal multipliers. What is the impact, in particular, of the higher incidence of liquidity constraints (that could be expected to increase multipliers) and of the increased fiscal stress (that could be expected to lower multipliers)?

At any rate, an appraisal of the efficiency of the fiscal intervention generally relates the fiscal reaction to its impact. In this connection, one can compare efficiency across countries but also try to relate the fiscal reaction to some benchmark (e.g., a no-policy-change scenario). The version of the paper that was presented by Sandro mainly focuses on the cross-country dimension and compares the fiscal reactions in Germany and Italy.

The paper specifically gauges the impact of the fiscal stimulus (measured in the “bottom-up” way) and the automatic stabilisers. With respect to the former, Italy is shown to be more “efficient” as a marginal budgetary worsening is accompanied by a boost to GDP of more than half a percentage point, while the increase to German GDP of somewhat less than 1 percentage point seems to require a significant worsening of the budget balance by 0.9 per cent of GDP. This may be due to the higher share, in Italy, of stimulus measures that, according to the literature, have a higher multiplier, such as the car scrapping schemes, as well as the increased incentives for investment in machinery. However, it should be stressed that the net budgetary impact of the Italian stimulus measures is lowered by the exceptional capital taxes, that were introduced to (partly) finance these measures. While these taxes are assumed to have only a negligible, if any, impact on current activity growth, the authors indicate that they may have important negative effects on government revenue in the coming years. In this sense, the measured “efficiency” of the Italian stimulus package in 2009 may come at a significant cost. As regards the automatic stabilisers, the picture is quite different, as, in this case, the German government seems to be much more efficient – when comparing the budgetary impact to the boost in GDP – in cushioning the impact of the recession. I was personally a bit puzzled by the relatively low impact of the automatic stabilisers in Italy (a worsening in the budget balance by 1.2 per cent of GDP would only boost GDP growth by 0.3 percentage points). The authors attribute the striking difference with the results for Germany to differences in the importance of unemployment benefits between both countries and, more generally, to higher multipliers in the model for the German economy. However, to my mind the paper could benefit from a deeper discussion of this issue (e.g., could it be that social expenditure is more targeted in Germany and that multipliers are generally lower in Italy due to Ricardian effects stemming from the higher level of government debt?).

By focusing on the stimulus measures and the automatic stabilisers the authors neglect the differences in budgetary trends, even though they indicated before that these may be important and the “bottom-up” measurement of fiscal stimulus that is used here may give a misleading picture of the actual fiscal policy loosening. Against that background, it may be worthwhile to develop more the other dimension in the paper, *i.e.* the comparison of government actions in each country with a neutral benchmark. Obviously, it is not easy to define such a neutral benchmark. The authors’ approach is to hold all budget items constant with respect to trend GDP. While that corresponds to my understanding of a neutral policy stance on the expenditure side, one could also define a neutral stance on the revenue side as a situation in which all revenue items grow (or, in this case, fall) in line with *actual* GDP. By comparing the results of this alternative simulation of a neutral policy stance with the actual developments, one may get an impression of the overall impact of policy action (irrespective of whether it comes with the “stimulus” label) in both countries.



Finally, apart from the quantification of the macroeconomic impact of the fiscal stimulus, which is the main focus of this paper, there are also a number of more qualitative considerations. To my mind, these primarily pertain to the third T of the 3T mantra: were the measures appropriately “targeted”, or to put it more bluntly: did the money end up where it was most needed? At least one observer – Ludger Schuknecht – is rather pessimistic on this issue as in his paper he argues that “targeting was poor”, “stimuli were also captured by special interests” and there was “little focus on facilitating economic restructuring”. Let’s take the example of the car scrapping schemes that were a key element of the stimulus packages in both countries considered here. On the one hand, one could argue that these subsidies target industries in need. On the other hand, one could also point to the important lobbying power of the car manufacturing industry: jobs were also threatened in, say, the local grocery stores but it may be more difficult to elicit government support measures in this case, even though such measures may have been equally appropriate, or inappropriate, as those in favour of the car producers. In addition, it is questionable whether support for the car manufacturing industry is the best example of stimulus measures that facilitate economic restructuring. More generally, I would like to stress that the “old” arguments against active demand management are still very relevant in my view: this applies to the political economy considerations related to “appropriate” targeting but also to the timeliness and the reversibility of the stimulus measures. In this latter connection, governments should now prove that they are capable of taking away the stimulus when it can no longer be justified in the context of the substantial consolidation programmes that are now required in most OECD countries.

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**COMMENTS ON SESSION 1**  
**AUTOMATIC STABILISERS AND DISCRETIONARY FISCAL POLICY**

**AUTOMATIC FISCAL STABILISERS:  
WHAT THEY ARE AND WHAT THEY DO**

*Martin Larch\**

During the Great Recession of 2008-09, fiscal policy played an important role in leaning against the sharp downturn of aggregate economic activity. Utterly shunned as a stabilisation tool in the years before the crisis, fiscal policy – especially discretionary stabilisation – celebrated an impressive comeback. As the policy rates of monetary authorities approached or hit the zero lower bound, the conviction soon gained ground that fiscal stimulus packages were needed. By the end of 2008, the US and most countries in the EU had implemented or had decided to implement fiscal measures to boost aggregate demand.

The size of the discretionary fiscal expansions varied significantly across the Atlantic: the US swiftly deliberated massive increases in government expenditure, while European governments were more prudent in terms of both timing and size of their interventions. In 2009, the US budget deficit widened by around 3 percentage points in cyclically-adjusted terms (a gauge of discretionary fiscal policy making) as opposed to “only” 1.5 percentage points in the euro area.

In view of the global dimension of the crisis, the apparent difference between the discretionary fiscal commitment of the US and the EU gave rise to a trans-Atlantic debate about the appropriate size of fiscal stimulus packages: the US felt that Europe could do more, whereas European governments defended their comparatively prudent stimulus packages by pointing to their larger automatic stabilisers. Alongside the political debate, scholars of public finances intensified a decades-long discussion about the relative importance and relative merits of discretionary versus automatic fiscal stabilisation.

The three papers on which I was asked to comment on – “Fiscal Policy in the United States: Automatic Stabilizers, Discretionary Fiscal Policy Actions, and the Economy” by Glenn Follette and Byron Lutz, “Fiscal Policy in Latin America: Countercyclical and Sustainable at Last?” by Christian Daude, Ángel Melguizo and Alejandro Neut, and “The Impact of the International Financial Crisis upon Emerging Economies and the Performance of Discretionary Fiscal Policies: The Case of Argentina” by Ernesto Rezk, Ginette Lafit and Vanina Ricca – are part of this revived discussion. While focusing on different countries or set of countries and using different methodologies, they all engage in an empirical exercise that examines the role played by the two “classical instruments” of fiscal stabilisation – automatic and discretionary – over past and recent cycles, including the Great Depression.

Apart from the valuable insights that the three papers offer about fiscal policy making and fiscal stabilisation in the US and Latin America, they also highlight some important and still unsettled issues associated with the measurement and interpretation of automatic stabilisers. In spite of a relatively large and seasoned body of literature on automatic stabilisers, the three papers are fairly representative for the persisting lack of clarity about what automatic fiscal stabilisers actual are and how we should assess their effectiveness with respect to output smoothing.

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Except for the notional understanding that automatic stabilisers involve budgetary arrangements that help smooth output without the explicit intervention of a country's fiscal authority, views in the literature very much diverge about which elements or components of the budget effectively provide the bulk of automatic stabilisation over the cycle. This lack of consensus is also reflected in the three papers.

There are no doubts concerning unemployment benefits: their mechanics and impact is unambiguous. But then unemployment benefits are a fairly negligible part of the government budget in most advanced countries. The bulk of automatic stabilisation originates somewhere else; but where?

Very early work associated automatic stabilisation with the built-in adjustment of the *level* of revenues and expenditure in a counter-cyclical fashion (e.g., Musgrave and Miller, 1948). According to this view, which dominated the literature for a long time, automatic stabilisers produce a smoothing effect on output mainly because revenues decline during downturns and increase during upturns. Later work also pointed to the stabilising properties of progressive taxation (e.g., Auerbach and Feeberg, 2000) but stuck to the notion that automatic stabilisation was mainly due to automatic variations of revenues. Follette and Lutz as well as Rezk *et al.* follow this tradition. In their paper automatic stabilisation results from changes of revenues and expenditure produced (*i.e.*, unemployment benefits) by cyclical swings in economic activity.

An alternative interpretation of automatic stabilisation is centred on the size of government. Fatás and Mihov (2001) were among the first to argue that provided governments can borrow, automatic stabilisation, essentially resulted from the inertia of discretionary spending over the cycle. If governments did not borrow to keep expenditure levels steady in the face of cyclical down- and upswings, that is if expenditure were to follow output, the budget would provide little automatic smoothing. Daude *et al.* implicitly take this view. I say implicitly because their position is not fully consistent. When discussing the concept of automatic stabilisation they refer to cyclical swings of revenues. However, when estimating the size of automatic stabilisers they follow an approach developed by the OECD, more specifically by Van den Noord (2000) and Girouard and André (2005), an approach which explicitly argues that the strength of automatic stabilisation is largely determined by the size of government.

On the face of it, the different views about the actual source of automatic stabilisation could be interpreted as a purely semantic issue. After all, and by their very nature automatic stabilisers mitigate output fluctuations without any explicit government action. Hence, as long as they do their job, it may be rather futile to ponder about whether they act on the revenue or the expenditure side.

Nevertheless, the issue of substance becomes apparent when trying to assess the actual effect of automatic stabilisation on output. This can only be done by comparing two types of budgetary arrangements: one in which automatic stabilisers are taken to be on, the other in which they are taken to be off. It is in this context, when defining the benchmark against which the effect of automatic stabilisers is to be gauged, that the professed notion of automatic stabilisation makes a difference.

In the literature there is no commonly agreed view of what a “neutral” budget looks like. Also in this respect the three papers are representative. Those who argue that stabilisation mainly stems from cyclical changes in the level of taxation use a benchmark budget where both government revenues and expenditure are fixed in absolute values. This is the case for Follette and Lutz and to some extent also for Rezk *et al.* Specifically, when simulating the effect of automatic stabilisers on output Follette and Lutz define the neutral budget as one in which revenues and expenditure are invariant with respect to output. Rezk *et al.* make reference to Musgrave and Miller whose analysis rests on the same assumption concerning a neutral budget. Daude *et al.*, by contrast, seem to think like Follette and Lutz and Rezk *et al.* but resort to a methodology that uses a different

benchmark, namely one in which both revenues and expenditure change in line with output. The same benchmark is also used by Brunila *et al.* (2003).

While equally arbitrary from an *ex ante* point of view, the two benchmarks have very different implications when it comes to assessing the degree by which automatic stabilisers help mitigate output fluctuations. If the benchmark is one in which revenues and expenditure vary in proportion to GDP, then proportional taxation does not produce any automatic stabilisation of output. In this case, stabilisation results from keeping expenditure steady. If on the other hand the benchmark is one where revenues and expenditure are fixed in level terms, any form of taxation that assumes a link between revenues and output will have a stabilising effect.

Can we reach any judgement about the relative merits or demerits of the two benchmarks? In my view yes. I would argue that invariant revenue and expenditure levels are neither a fair nor a useful benchmark for a “neutral” budget. To me neutrality means that budgetary aggregates remain neutral with respect to GDP, the macro variable that is expected to be stabilised. Invariant revenues and expenditure level do not score on this count.

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## **Session 2**

### **FISCAL IMPULSE**





# FISCAL POLICY AND MACROECONOMIC STABILITY: NEW EVIDENCE AND POLICY IMPLICATIONS

*Xavier Debrun<sup>\*</sup> and Radhicka Kapoor<sup>\*\*</sup>*

*The paper revisits the empirical link between fiscal policy and macroeconomic stability. Our basic presumption is that by definition, the operation of automatic stabilizers should always and everywhere contribute to greater macroeconomic stability (output and consumption). However, two stylized facts seem at odds with that prediction. First, the moderating effect of automatic stabilizers appears to have weakened in advanced economies between the mid-1990s and 2006 (the end of our main sample). Second, automatic stabilizers do not seem to be effective in developing economies. Our analysis addresses these apparent puzzles by accounting for the government's ambivalent role as a shock absorber and a shock inducer for determinants of macroeconomic volatility over time. Results provide strong support for the view that fiscal stabilization operates mainly through automatic stabilizers.*

## 1 Introduction

Recent developments in macroeconomic modeling and pressing policy challenges have revived the classic debate on the effectiveness of fiscal policy as an instrument of macroeconomic stabilization (Van der Ploeg, 2005). On the theory side, the rapid development of micro-founded general equilibrium models with non-Ricardian features has allowed researchers to assess the benefits of fiscal stabilization in a coherent and rigorous analytical framework (see Botman *et al.*, 2006, for a survey). These studies confirm the conventional wisdom that a timely countercyclical response of fiscal policy to demand shocks is likely to deliver appreciably lower output and consumption volatility (Kumhof and Laxton, 2009). However, well-intended fiscal activism can also be undesirable, when shocks are predominantly affecting the supply side (Blanchard, 2000), or squarely destabilizing, when information, decision and implementation lags unduly lengthen the transmission chain. On the policy side, a growing number of countries turned to fiscal policy as their primary stabilization instrument either because of changes in their monetary regime (currency board, hard peg, participation in a monetary union) or because financial conditions deteriorated to the point of making monetary policy ineffective (Spilimbergo *et al.*, 2008).

Fiscal policy can contribute to macroeconomic stability through three main channels. The first is the automatic reduction in government saving during downturns and increase during upturns, cushioning shocks to national expenditure (Blinder and Solow, 1974). Such *automatic stabilization* occurs because tax revenues tend to be broadly proportional to national income and expenditure, whereas public spending reflects government commitments independent of the business cycle and entitlement programs specifically designed to support spending during

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downturns, including unemployment benefits.<sup>1</sup> Also, to the extent that government consumption is less volatile than other components of GDP, the public sector contributes to output stability through a mere composition effect of domestic expenditure. Second, governments can deliberately change public spending and tax instruments to offset business cycle fluctuations. Finally, the structure of the tax and transfer system can be designed to maximize economic efficiency and market flexibility, thereby enhancing the resilience of the economy in the face of shocks. The notion of fiscal stabilization pertains to the first two channels.

The public's demand for government-induced stability reflects a number of factors that may vary over time and across countries, including the inherent resilience of the economy and the existence of alternative stabilizers, such as an effective monetary policy and unrestricted access of individual agents to financial instruments. During the recent crisis, the perceived need for fiscal stabilization has been unquestionably high: the resilience of national economies was impaired by the depth and the global nature of the shock, agents faced either limited access to or high cost of self-insurance through credit markets and financial institutions, and the firepower of monetary policy was constrained by the zero-bound on nominal interest rates. In the short term, the stabilizing role of fiscal policy relies on effective automatic stabilizers and on the capacity of governments to engineer (and credibly phase out) a fiscal stimulus in a timely fashion.

This paper puts the current revival of fiscal stabilization policies in a broader perspective by revisiting the contribution of fiscal policy to macroeconomic stability in both industrial and developing economies over the last 40 years. The study builds on earlier work by Galí (1994), Van den Noord (2002), and Fatás and Mihov (2001, 2003), who investigate directly the cross-country relationship between fiscal policy indicators and output volatility. That approach has the advantage to incorporate in simple statistical tests various determinants of the stabilizing effect of fiscal policy, including policymakers' "reaction functions" and the actual impact of fiscal measures on output and private consumption. The resulting, reduced-form empirical relations thus provide useful information on the effectiveness of fiscal policy, while avoiding the methodological issues related to the estimation of fiscal "multipliers." Indeed, multipliers' estimates highly sensitive to the identification procedure of exogenous fiscal impulses (structural VARs, narratives, or DSGE model simulations), the nature of the shock (tax cuts, spending increases), and the behavior of monetary policy (Blanchard and Perotti, 2002; Perotti, 2005; Romer and Romer, 2008; and Horton, Kumar and Mauro, 2009, for a survey).

Existing analyses of fiscal stabilization tend to focus on the role of automatic stabilizers in industrial economies. Many of those draw on the seminal insights of Galí (1994) and revolve around the negative relationship between output volatility and government size, used as a proxy for the cyclical sensitivity of the budget balance. While the literature generally confirms the countercyclical impact of automatic stabilizers, the relationship appears to be a complex one. First, non-linearities seem to exist,<sup>2</sup> suggesting that the adverse effect of high tax rates on an economy's resilience could more than offset the action of automatic stabilizers. Second, the relationship may be changing over time as structural changes moderating output volatility could be faster in economies with leaner governments.<sup>3</sup> Finally, the relationship does not seem to hold beyond a narrow sample of industrial OECD countries.<sup>4</sup> Debrun, Pisani-Ferry and Sapir (2008) addressed the

<sup>1</sup> Darby and Mélitz (2008) and Furceri (2009) show that social spending – including health and retirement benefits – is more countercyclical than generally acknowledged. For instance, early retirement and sick leave – which often protects employees against involuntary separation – are more likely to be used during downturns.

<sup>2</sup> Examples include Silgoner, Reitschuler and Crespo-Cuaresma (2002), and Martínez-Mongay and Sekkat (2005).

<sup>3</sup> Debrun, Pisani-Ferry and Sapir (2008) and Mohanty and Zampolli (2009) document an apparent breakdown of the relationship between government size and output volatility in the 1990s.

<sup>4</sup> Fatás and Mihov (2003) find that government size actually increases output volatility in a cross-section of 91 countries. Viren (2005), using an even larger cross-section of 208 countries and territories, concludes that "*the relationship between government size* (continues)

first two concerns, introducing a time-dimension in the Fatás-Mihov sample to control for potential determinants of the “great moderation”, (*i.e.* the steady decline in output volatility observed between the mid-1980s and the recent past). Their results confirm the effectiveness of automatic stabilizers in reducing output volatility.

This paper looks further into the robustness of the results described above. Our contribution rests on 4 elements. First, our sample includes 49 industrial and developing countries for which reasonably long time series exist for fiscal data covering the general government. Second, we take into account the potentially destabilizing impact of fiscal policy, as public finances are used to attain other goals than macroeconomic stability. Should bigger governments produce larger fiscal shocks, estimates of the impact of automatic stabilizers would be biased. Third, we account for the role of potential substitutes to fiscal policy as a macroeconomic insurance mechanism, including financial development, improved monetary policy credibility, and better economic policy governance. These variables may account for the decline in output volatility observed until the recent crisis and may prove important to properly identify the causal relation between automatic stabilizers and volatility (see Debrun, Pisani-Ferry, and Sapir, 2008, and Mohanty and Zampolli, 2009). Fourth, we investigate the extent to which fiscal policy contribute to lower private consumption volatility, as the latter is more closely related to welfare.

The main results can be summarized as follows. First, automatic stabilizers strongly contribute to output stability regardless of the type of economy (advanced or developing), confirming the effectiveness of timely, predictable and symmetric fiscal impulses in stabilizing output. The impact on private consumption volatility is quantitatively weaker and statistically less robust. Second, countries with more volatile cyclically-adjusted budget balances also exhibit more volatile output and private consumption. However, the result could be tainted by a reverse causality problem that we could not satisfactorily address with instrumental-variables techniques due to a weak-instrument problem. Third, access of individual consumers to credit appears to exert a stabilizing influence on output and private consumption. A weaker contribution of credit supply to smooth cyclical fluctuations could thus increase the public’s appetite for fiscal stabilization.

The rest of the paper is structured as follows. Section 2 discusses data issues and reviews stylized facts. Section 3 develops the econometric analysis, while Section 4 discusses the results and draws policy implications.

## 2 Data and stylized facts

### 2.1 Governments as shock absorbers and shock inducers

The size of automatic stabilizers is commonly approximated by the ratio of general government expenditure to GDP. Using a rule of thumb according to which the elasticity of government revenues and expenditure (both in levels) to the output gap is 1 and 0 respectively, the expenditure-to-GDP ratio is indeed equal to the semi-elasticity of the overall budget balance (in percent of GDP) to the output gap.<sup>5</sup>

However, if size matters for automatic stabilization, it could also prove harmful for macroeconomic stability if bigger governments tend produce larger fiscal shocks than their leaner counterparts. To avoid an omitted-variable bias, it is important to control for this possibility in the econometric analysis. The rest of this sub-section constructs a set of mutually-consistent fiscal

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and output volatility is either nonexistent or very weak at best.” Mohanty and Zampolli (2009) find that even among OECD countries government size only has a modestly negative impact on output volatility.

<sup>5</sup> See equations (1) and (2) below.

indicators capturing three relevant dimensions of fiscal policy: automatic stabilizers, systematically stabilizing discretionary policy, and non-systematic policy (which can be stabilizing or not).

### 2.1.1 *Three dimensions of fiscal policy*

To look at the cyclical properties of the overall budget balance, it is common to split it in two components: the cyclical balance and the cyclically-adjusted balance (see for instance, Galí and Perotti, 2003). Changes in the cyclical balance give an estimate of the budgetary impact of aggregate fluctuations through the induced changes in tax bases and certain mandatory outlays. By construction, the cyclical balance is zero when the output gap is closed (actual output is on trend), and its variations are thought to be outside the immediate control of the fiscal authorities. Subtracting the cyclical balance from the overall balance yields the cyclically-adjusted balance (CAB), or the hypothetical overall balance one would observe if output was on trend (or “potential”) level. Changes in the CAB are generally interpreted as resulting mostly<sup>6</sup> from discretionary actions by policymakers.

The CAB itself reflects two dimensions of fiscal policy relevant for our analysis. The first is the effect of policy decisions systematically related to changes in the actual or expected cyclical conditions of the economy. For instance, governments wishing to actively pursue a countercyclical policy could reduce taxes or increase government consumption whenever the economy is in a recession, while withdrawing the stimulus during the recovery and reducing public spending during booms. The response of the CAB to the cycle can either be pro-cyclical (running against automatic stabilizers) or countercyclical (augmenting the effect of automatic stabilizers). The second source of variations in CABs arises from budgetary changes that are not the result of the average response of fiscal authorities to the business cycle. This “exogenous” CAB can either reflect extraordinary fiscal stabilization efforts—such as those adopted in response to the recent crisis—or destabilizing fiscal impulses associated with other objectives of public finances (redistribution and efficiency), or non-economic considerations (e.g., electoral budget cycle).

Thus, from now, fiscal policy will be discussed in light of those three dimensions of the overall balance, namely:

- (i) automatic stabilizers;
- (ii) the “cyclical fiscal policy”, reflecting the *systematic* response of the CAB to the business cycle;
- (iii) and the “exogenous discretionary fiscal policy” capturing CAB changes that are not systematically related to current macroeconomic conditions.<sup>7</sup>

### 2.1.2 *Quantifying the three dimensions*

Data analysis alone does not allow disentangling the impact of automatic stabilizers from that of systematic discretionary stabilization. To solve that identification problem, we simply *assume* that automatic stabilizers are adequately measured by the ratio of public expenditure to GDP. That assumption enhances the comparability of our results with related studies and provides a simple and transparent metric applicable to all countries. But it entails a potential measurement error that we will need to keep in mind when interpreting the results (see further discussion below).

<sup>6</sup> Studies of the fiscal stance often exclude interest payments, as they reflect past policies (public debt) and financial conditions.

<sup>7</sup> This is the terminology used by Fatás and Mihov (2009). For a more detailed discussion of cyclical adjustment, see Fedelino, Ivanova and Horton (2009).

A CAB consistent with our assumption is needed to derive indicators of the “cyclical” and exogenous policies defined above. As indicated earlier, government size is an exact measure of the sensitivity of the budget balance to the business cycle if revenue and expenditure elasticities to output are 1 and 0 respectively. To see this, define the CAB (in percentage of trend output  $Y^*$ ) as:

$$\begin{aligned} CAB &\equiv \frac{R(Y^*/Y)^{\eta_R}}{Y} \frac{Y}{Y^*} - \frac{G(Y^*/Y)^{\eta_G}}{Y} \frac{Y}{Y^*} \\ &= r(Y^*/Y)^{\eta_R-1} - g(Y^*/Y)^{\eta_G-1} \end{aligned} \quad (1)$$

where  $r$  is total revenue as a ratio of GDP ( $Y$ ),  $Y^*$  is the trend level of output,  $\eta_R$  is the elasticity of revenue to the output gap,  $g$  is the expenditure to GDP ratio, and  $\eta_G$  is the elasticity of expenditure to the output gap. Setting  $\eta_R = 1$  and  $\eta_G = 0$  and denoting by  $b$  the overall budget balance (in percent of GDP) yields:

$$\begin{aligned} CAB &= r - g(Y^*/Y)^{-1} \\ &= b - g(Y^*/Y)^{-1} + g \\ &= b - g(Y/Y^* - 1) \\ &= b - gy, \end{aligned} \quad (2)$$

where  $y$  is the output gap in percentage of trend output ( $y \equiv (Y - Y^*)/Y^*$ ), and  $gy$  is the cyclical balance. This formally establishes that the public expenditure ratio is the semi-elasticity of the budget balance (in percent of GDP) to the output gap.<sup>8</sup>

Indicators of the cyclical and exogenous/discretionary fiscal policies can then be estimated for each country in our sample, using a simple time-series regression:<sup>9</sup>

$$CAB_t = \alpha + \beta y_t + \gamma CAB_{t-1} + \mu_t \quad (3)$$

where the output gap  $y_t$  is calculated as the relative deviation of actual GDP from an HP trend. The first-order autoregressive term on the right-hand side of (3) accounts for persistence in budget balances, and effectively eliminates the severe first-order serial correlation of residuals observed in static regressions.

The cyclical fiscal policy is captured by  $\beta$ , the short-term response of the CAB to the output gap. A negative value implies that a cyclical upturn (downturn) tends to deteriorate (improve) the CAB, indicating that government actions are systematically destabilizing and offset – at least partly – the impact of automatic stabilizers on the economy. On the other hand, a positive coefficient on  $y_t$  implies that on average, the government seeks to increase the counter-cyclical bent of fiscal policy through discretionary measures.

The effectiveness of fiscal policy entails reverse causality from CAB to  $y$ , introducing a downward bias in OLS estimate of  $\beta$ . Also, equation (3) is parsimonious by necessity (time series are short in some countries), which could create an omitted variable bias. To alleviate potential

<sup>8</sup> Of course, this does not mean that automatic stabilizers arise from the expenditure side since we assumed  $\eta_G=0$ .

<sup>9</sup> Galí and Perotti (2003), Wyplosz (2006) and Fatás and Mihov (2009) use a similar specification to study the cyclical features of fiscal policy. Fatás and Mihov (2003) and Afonso, Agnello and Furceri (2009) also rely on a regression-based method to distinguish between cyclical, persistence, and the volatility of public expenditure.

biases in the estimated  $\beta$ 's, instrumental variable (IV) techniques are used. Instruments for the output gap include its own lagged value, log-differenced terms of trade and oil prices, and energy use per capita.<sup>10</sup> A priori, these are adequate instruments – especially for small open economies – as cyclical fluctuations are correlated with terms of trade shocks, oil prices and energy use per capita, without being directly influenced by the fiscal stance. For oil exporters, however, we used the lagged value of the output gap, the output gap of the United States, and its lagged value.<sup>11</sup>

The exogenous discretionary policy is calculated as the variability (standard deviation) of a residual  $\hat{\zeta}_t = CAB_t - \hat{\alpha} - \hat{\beta}y_t - \hat{\gamma}(CAB)_{t-1}$ , where  $\hat{\alpha}$ ,  $\hat{\beta}$ , and  $\hat{\gamma}$  are obtained from IV estimation. This differs from the standard error of residuals in equation (3),  $\sigma_i^\mu = \sqrt{\text{var}_i(\hat{\mu}_i)}$ . The reason is that, having instrumented the output gap, the residual of (3) would incorporate the non-instrumented part of the output gap ( $\hat{\beta}(y_t - \hat{y}_t)$ ), introducing co-movement between our measure of discretionary policy and output gap volatility. This would in turn create a simultaneity bias in the regressions performed to estimate the effect of fiscal policy on output gap variability. By their very nature, these residuals capture more than discretionary policy decisions, including measurement errors, and the direct budgetary impact of certain shocks over and above their influence on economic activity (for instance, exchange rate fluctuations affecting interest payments and commodity-related revenues, the influence of asset prices on certain revenue categories, and inflation shocks). The notion of “exogenous discretionary policy” should therefore be interpreted with caution. While equation (3) could be augmented to account for some of these effects, the measurement of pure shocks raises other issues that would ultimately alter the transparency of our simple approach.

### 2.1.3 Caveats

In interpreting our empirical results, one should keep in mind that government size is only an approximation of the cyclical sensitivity of the budget balance. To assess the likelihood of any bias introduced by that proxy, we look at the relation between the public expenditure to GDP ratio and the semi-elasticities of the budget balance to the output gap estimated by the OECD for most of its member countries (Figure 1). These estimates partly take into account the impact of tax progressivity and cyclically-sensitive expenditure.<sup>12</sup> The regression line is statistically indistinguishable from a 45-degree line, indicating that government size is a reliable proxy of automatic stabilizers in OECD countries.

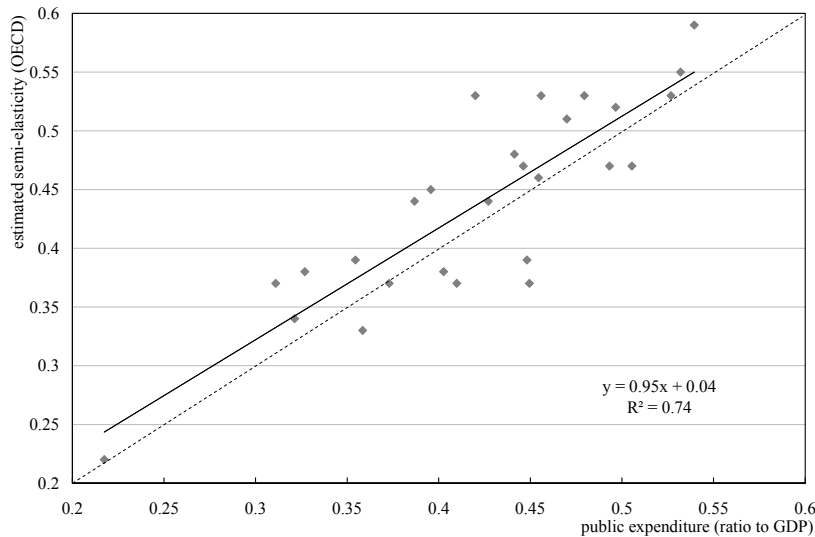
Outside the OECD, however, lower output sensitivities may prevail. On the revenue side, a greater share of indirect taxes in revenues and a lower degree of progressivity in direct taxes tend to weaken the responsiveness of tax revenues to income. On the expenditure side, unemployment insurance and other social safety nets are generally less developed. Given this, we may overestimate the size of automatic stabilizers in developing countries, while underestimating their impact on output and consumption volatility. We would correspondingly overestimate the

<sup>10</sup> Lee and Sung (2007) estimate the responsiveness of fiscal policy to cyclical fluctuations, taking the average of GDP growth rates in neighboring countries, weighted by the inverse of the distance between the two countries, as an instrument.

<sup>11</sup> There are five oil producing countries in the sample. Ideally, the non-oil fiscal balances should be used in the regression. However, no sufficiently long time series were available to obtain meaningful estimates of  $\beta$ . Dropping these countries from the sample does not alter the results.

<sup>12</sup> Some ad-hoc assumptions remain, however, including a unit-elasticity of indirect taxes and a zero-elasticity for expenditure except unemployment benefits. The latter may be a strong assumption in light of Darby and M  litz (2009) who show that social spending other than unemployment benefits exhibits a significant countercyclicality, including health and pension expenditure. Building on these results, Furceri (2009) estimates that social spending alone is able to offset about 15 percent of output shocks.

**Figure 1**  
**Government Size and Cyclical Sensitivity of the Budget Balance**



Sources: Girouard and André (2005) and authors' calculations.

stabilizing influence of cyclical fiscal policy, as  $\hat{\beta}$  would capture any measurement error in the size of automatic stabilizers. Another issue is that short time series limit our ability to test for the presence of structural breaks in the relation between the CAB and the output gap. In general, tests conducted for OECD countries – for which we have time-series starting in 1970 – do not allow to reject the null hypothesis that  $\beta$  is stable between two sub periods (1970-89 and 1990-2006).

## 2.2 Output volatility and automatic stabilizers: stylized facts

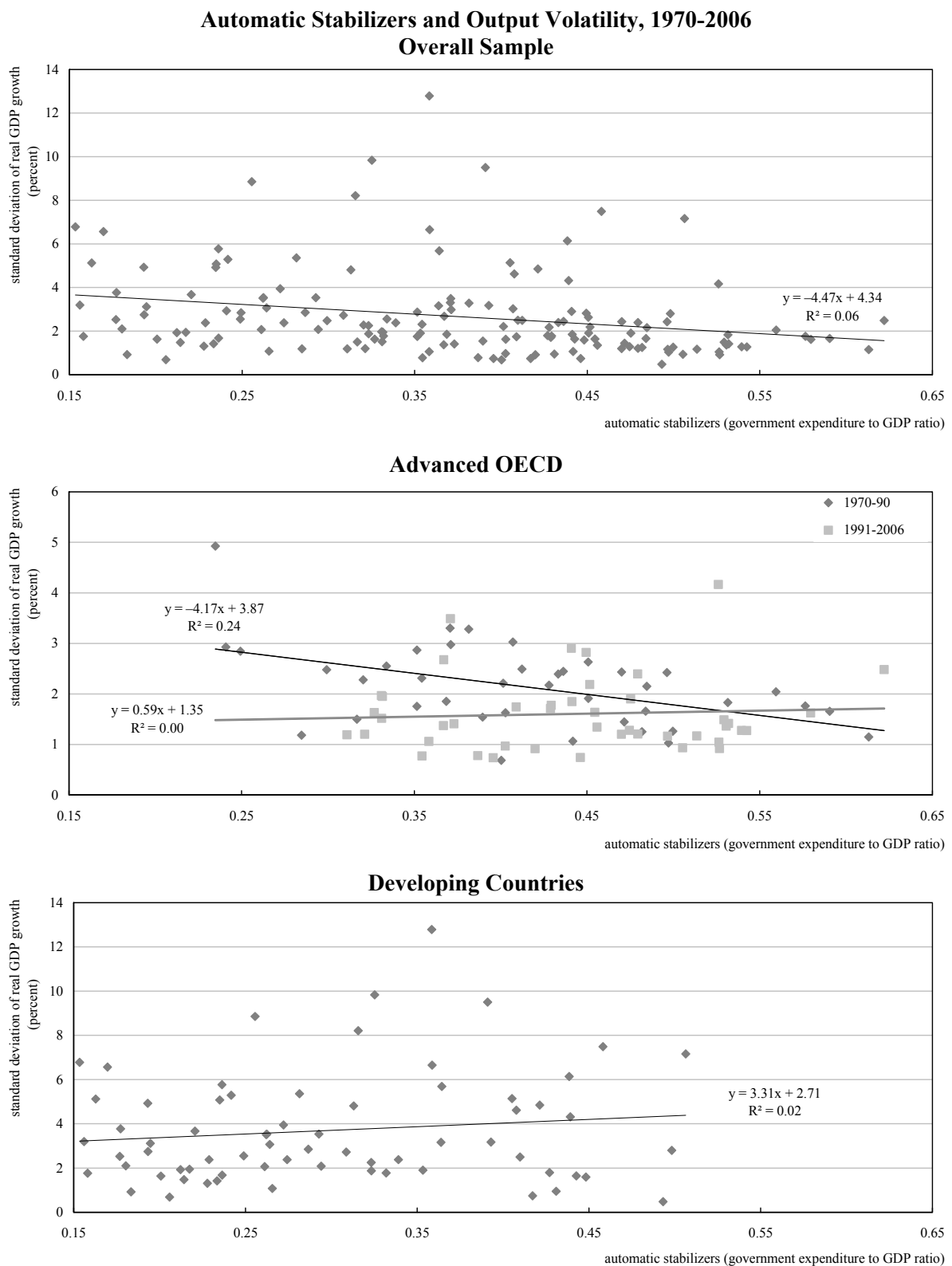
The seminal studies by Galí (1994) and Fatás and Mihov (2001) suggest that the effectiveness of automatic stabilizers is already evident from the negative unconditional correlation between real GDP growth variability and the size of government, and they show this for a sample of selected OECD countries between 1960 and the early 1990s. Our broader sample, which covers selected developing economies and ends in 2006, exhibits a similar correlation (Figure 2, top panel). Subsequent analyses qualified this result, suggesting that the relation is likely to be non-linear and unstable over time. Using the same set of countries as Fatás and Mihov (2001), Debrun, Pisani-Ferry and Sapir (2008) document a dramatic weakening of the negative relation after the mid 1990s, a stylized fact present in our sample for advanced OECD countries (Figure 2, center panel). Econometric analysis by the same authors also revealed non-linearities in this relation, implying strongly decreasing returns in automatic fiscal stabilization beyond a certain threshold of government size. Silgoner, Reitschuler and Crespo-Cuaresma (2002), and Martínez-Mongay and Sekkat (2005) found similar non-linearities in a sample of EU member states.

Although the literature generally supports the effectiveness of automatic stabilizers in OECD countries, some have suggested that the result may not hold in developing economies. In particular, Viren (2005) finds that the negative relation between government size and GDP volatility does not exist when developing economies are included in the sample. Using our sample, scatter plots indeed depicts a weakly *positive* correlation for the subset of developing countries (Figure 2, bottom panel).

These stylized facts raise two questions. First, it is unclear why automatic stabilizers per se would be subject to strong “decreasing returns”.<sup>13</sup> Second, even if government size exaggerates the

<sup>13</sup> That said, in a reduced-form IS-curve, the relation between output and the size of automatic stabilizers is log-linear because the fiscal impulse stemming from the operation of stabilizers itself depends on output (see the Appendix).

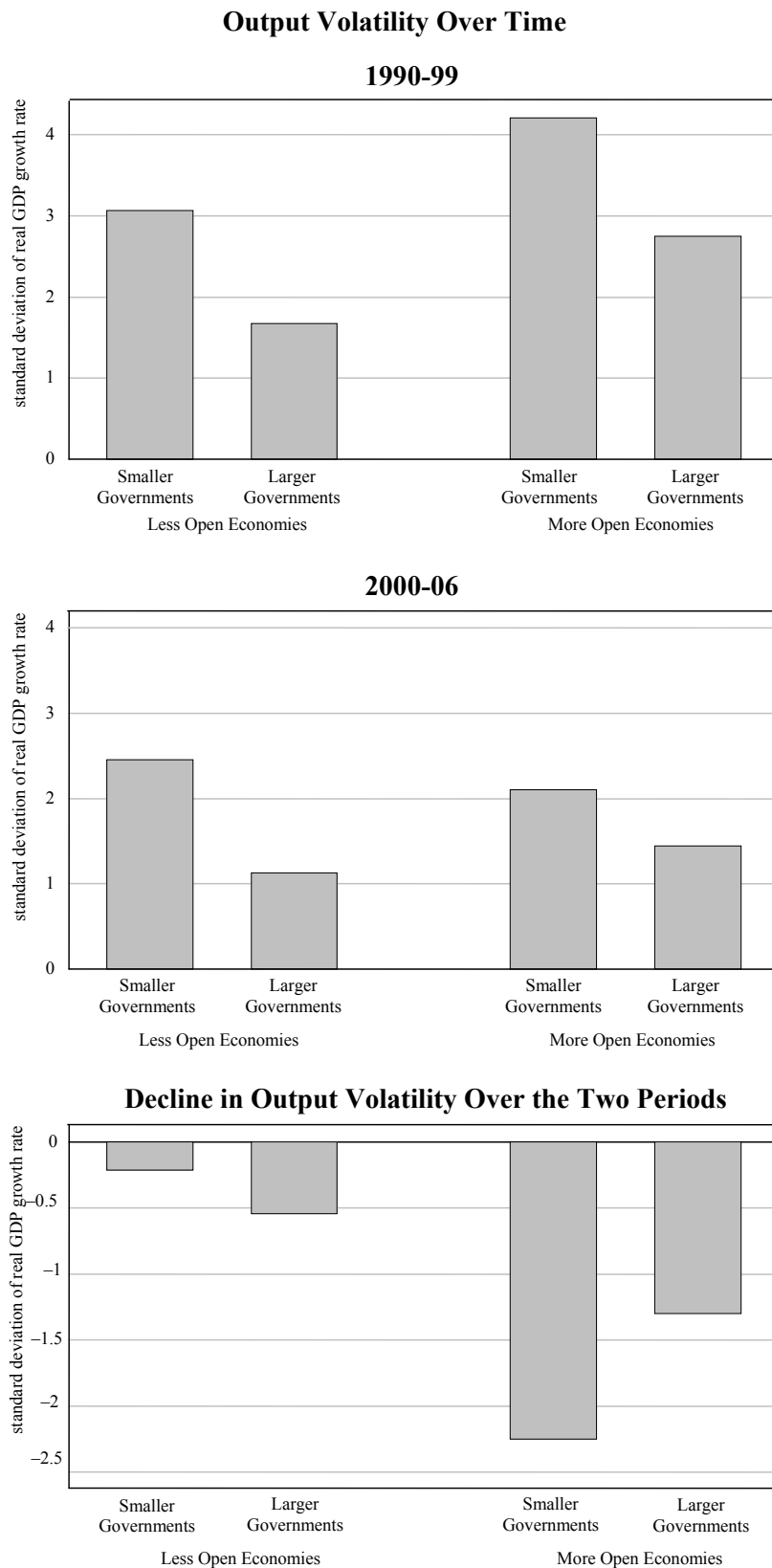
Figure 2



Note: Each observation represents a combination of government size and real GDP growth volatility observed in one country over a given decade.

Source: Authors' calculations.



**Figure 3**

Source: Authors' calculations.

magnitude of automatic stabilizers in developing countries, the existence of a positive relationship remains counterintuitive. Both puzzles are consistent with the need to take into account the shock-inducing aspect of fiscal policy. The appearance of decreasing returns could indeed result from the fact that bigger governments generate more destabilizing fiscal shocks, as documented in Debrun and Kapoor (2010). Likewise, the apparent ineffectiveness of automatic stabilizers in developing countries may have to do with more pervasive institutional weaknesses and political economy constraints in these countries that magnify the shock-inducing part of fiscal policy to the point of overcoming automatic stabilizers.

Another interesting characteristic of the relation between output volatility and government size is that it seems to be evolving over time, stressing the importance to examine possible causes for such evolution. Debrun, Pisani-Ferry and Sapir (2008) show that the factors driving the trend decline in output volatility until the recent crisis – the so-called great moderation – were more powerful in countries with smaller government sectors than

others. We can verify this in our broader sample and divide countries into 4 categories along 2 dimensions: trade openness and government size (cut-off levels are the median values). We consider only the last two periods of our sample 1990-99 and 2000-06 to cover all the countries.

For both sub-periods, output volatility is on average larger in countries with smaller governments, regardless of trade openness (Figure 3). Rodrik's (1998) observation that more open economies are generally more volatile is verified for 1990-99, but not for the more recent period. Indeed, the bottom panel of Figure 3 shows that the decline in average output volatility between the two subperiods has been more pronounced in more open economies, and among the latter in countries with smaller governments. This suggests that open economies with smaller government took better advantage of the factors driving the great moderation, such as improved access to financial instruments, credit and external financing, allowing economic agents to better smooth consumption and plan investment. Also, openness tends to raise the economic cost of policy mistakes, contributing to better macroeconomic management, including more countercyclical macroeconomic policies.

### 3 Econometric analysis

#### 3.1 Testing the effectiveness of automatic stabilizers

Following Fatás and Mihov (2001), the empirical test is based on the *cross-country* relation between government size and output volatility. As we also take into account time-varying factors that may affect the public's demand for fiscal stabilization or the government's incentives to provide such stabilization (Debrun, Pisani-Ferry and Sapir, 2008), the baseline empirical model is a panel regression with period-fixed effects:<sup>14</sup>

$$Y_{i,t} = \alpha + \sum_{t=2}^{t=4} \lambda_t P_t + \phi_1 G_{i,t} + \phi_2 Cyc_i + \phi_3 Discr_{i,t} + \sum_{j=1}^J \theta_j X_{j,i,t} + v_{i,t} \quad (4)$$

with  $i = 1, \dots, 49$  (countries) and  $t = 1, \dots, 4$  (10-year period).  $Y_{i,t}$  is a measure of real GDP volatility, the  $P_t$ 's symbolize period fixed effects,  $G_{i,t}$  denotes the size of automatic stabilizers (logarithm of public expenditure in percent of GDP),  $Cyc_i$  and  $Discr_{i,t}$  are the cyclical and discretionary dimensions of fiscal policy discussed in Section 2, the  $X_j$ 's are control variables, and  $v_{i,t}$  is the error term. As the cyclical indicator is an estimated coefficient, it is sometimes not statistically different from zero. To reduce the noise stemming from such uncertainty, we set  $Cyc_i$  equal to zero for countries where the  $\hat{\beta}_i$  is statistically insignificant at the 10 percent confidence level. The discretionary dimension  $Discr_{i,t}$  is calculated for each subperiod to capture any change in the average magnitude of fiscal policy shocks non-systematically related to the business cycle.

By default, we calculate output volatility as the standard deviation of real GDP growth over each period  $t$ . However, since this measure is sensitive to variations in potential growth (over time and across countries), we systematically checked the robustness of our results using the standard deviation of the first differenced output gap (calculated by us for all countries as the relative difference between actual real GDP and its HP-filtered series). The focus on aggregate output

<sup>14</sup> The time dimension comprises 4 periods over which annual data have been averaged (1970-79, 1980-89, 1990-99 and 2000-06). The panel is unbalanced because of data limitations for developing and emerging market economies. The Appendix reports data sources. Input from auxiliary regressions can be found in Debrun and Kapoor (2010).

volatility – instead of privately-generated GDP, for instance – is justified by the fact that the contribution of fiscal policy to macroeconomic stability also operates through composition effects of national expenditure (Andrés, Doménech and Fatás, 2008). Although there is no evident theoretical reason for rejecting these effects, we also investigated the relationship between our fiscal indicators and the variability of private consumption because the latter is more directly related to welfare.

A rejection of the null hypothesis that  $\phi_1 = 0$  against the alternative  $\phi_1 < 0$  is consistent with the effectiveness of automatic stabilizers. The Appendix formally illustrates that, given a sample average of 0.38 for government size, plausible values of  $\phi_1$  lie between  $-0.5$  and  $-2.6$ . As we have more observations than most comparable studies, we are better placed to deal with the omitted-variables and reverse causality issues inherent to a single-equation approach. More specifically, we introduce determinants of volatility that have been related to the “great moderation” episode and are suspected to have weakened the relation between government size and output volatility. We then we assess the robustness of our results, and expand the analysis to private consumption volatility.

### 3.2 Fiscal policy: shock-absorbing or shock-inducing?

We first estimate a parsimonious model deliberately omitting discretionary and cyclical dimensions of fiscal policy as well as time-series determinants of output volatility (Table 1). The results are consistent with two stylized facts noted earlier. First, non-OECD-20 countries are both more volatile and have smaller governments, explaining why the standard stabilization result holds for the whole sample but not for the non-OECD-20 subset. Second, among the OECD-20 group, the effectiveness of automatic stabilizers seems to have decreased substantially over the last two decades.

We conjectured earlier that omitting  $Discr_{i,t}$  could entail a serious upward bias in estimates of  $\phi_1$  if bigger governments also tended to induce larger shocks. The results summarized in Table 2 – which now include all dimensions of fiscal policy and the time-series controls – lend support to that hypothesis: the size of government now has a negative and statistically significant impact on output volatility, and this regardless of whether we restrict the sample to certain economies or sub-periods. The absolute values of  $\hat{\phi}_1$  are higher than previously estimated, and the confidence intervals are narrower. They are also quantitatively similar to Fatás and Mihov (2001) – around 2 – despite a very different sample.

These results differ from Fatás and Mihov (2003) who find that government size has a positive effect on volatility in a cross-section of 91 countries. Their model is similar to (4) except that (i) they have no measure of  $Cyc_i$ , (ii) the time dimension is missing, and (iii) their measure of  $Discr_{i,t}$  is based on public consumption only. Two important reasons for the difference are that our approach allows for a richer set of relevant determinants of volatility (e.g., financial development) and that it uses measures of automatic stabilizers, cyclical policy and discretionary policy that are mutually consistent and based on a broad coverage of the government sector.

While we fail to find any significant stabilizing impact of the cyclical dimension (a sign that this series may be too noisy), the coefficient  $\hat{\phi}_3$  on the discretionary dimension is positive and significant for the unrestricted sample and for the sub-sample excluding the OECD-20. In contrast,  $\hat{\phi}_3$  is not significantly different from zero in the OECD-20. Also, the fit of the model increases

Table 1

## A Parsimonious Model

Dependent Variable	Standard Deviation of Real GDP Growth Rate				
	All	Non-OECD		OECD (1970-89)	OECD (1990-2006)
	1	2		3	4
Openness	1.143 (1.32)	0.150 (0.11)		1.617* (1.87)	0.720 (1.17)
Automatic Stabilizers	-1.614*** (-4.45)	1.038 (1.35)		-2.224*** (-2.78)	-0.244 (-0.41)
Constant	0.728 (1.21)	5.614*** (3.19)		-0.418 (-0.48)	0.675 (0.99)
Observations	152	75		37	40
R-squared	0.14	0.15		0.33	0.32

Note: Robust *t*-statistics in parentheses. Time effects are not reported. Stars denote statistical significance at conventional levels (\* for 10 per cent, \*\* for 5 per cent, and \*\*\* for 1 per cent).

Table 2

**Introducing Cyclical and Discretionary Dimensions of Fiscal Policy**  
*(dependent variable: standard deviation of real GDP growth rate)*

Dependent Variable	OECD-20	Non OECD-20	All	All 1970-89	All 1990-2006	All
	1	2	3	4	5	6
Openness	0.717 (1.56)	0.462 (0.48)	0.507 (0.79)	-0.389 (-0.33)	0.684 (1.00)	0.519 (0.86)
Automatic Stabilizers	-1.409*** (-2.93)	-1.605* (-1.79)	-2.013*** (-5.00)	-1.290** (-2.30)	-2.257*** (-3.89)	-1.680*** (-4.21)
Central Bank Independence	-0.117 (-0.27)	0.715 (0.47)	1.096* (1.79)	0.138 (0.18)	1.404 (1.63)	-2.728*** (-2.62)
Financial Development	-0.446* (-1.98)	-0.01 (-0.02)	-0.788*** (-3.01)	-0.577 (-1.08)	-0.770** (-2.56)	-0.550** (-2.20)
Cyclical Fiscal Policy	-0.065 (-0.27)	0.209 (0.15)	0.114 (0.38)	-0.214 (-0.51)	0.030 (0.07)	0.026 (0.09)
Discretionary Fiscal Policy	0.016 (0.16)	0.911*** (4.62)	0.672*** (4.64)	0.186 (1.19)	0.877*** (4.66)	-0.451* (-1.79)
Interaction: Discretion x CBI	...	...	...	...	...	2.118*** (3.83)
Constant	1.013** (2.13)	-2.501 (-1.17)	-1.134 (-1.51)	0.992 (0.42)	-2.617** (-2.42)	...
Observations	77	56	133	47	86	133
R-squared	0.40	0.52	0.50	0.35	0.57	0.58

Note: Robust *t*-statistics in parentheses. Time effects are not reported. Stars denote statistical significance at conventional levels (\* for 10 per cent, \*\* for 5 per cent, and \*\*\* for 1 per cent).

substantially. These results suggest that discretionary fiscal policy is likely to be an important contributor to output volatility outside the core OECD economies covered in previous studies. This is in line with Fatás and Mihov (2003), although our measure of discretionary policy – based on budget balance volatility – is quite different from theirs – volatility of GDP-growth-adjusted public consumption.

An interesting observation is that the degree of central bank independence has a significantly positive impact on volatility, a result largely driven by the presence of the non-OECD-20 countries in the sample. This could suggest that anti-inflationary credentials take time to build up despite rising degrees of legal independence, or that productivity shocks and decision lags entail a meaningful trade-off between real and nominal stability.

Another possibility is that coordination failures in the policy mix could be more frequent when monetary and fiscal authorities independently pursue different objectives. Specifically, fiscal impulses unrelated to routine stabilization are more likely to lead to costly conflicts with monetary authorities when the latter are politically independent than when they are forced to accommodate fiscal shocks. To explore that conjecture, we added to the model an interaction term between the index of central bank independence (CBI) and our measure of exogenous fiscal policy. In the presence of the interaction term, the estimated coefficient of CBI turns negative and significant – as one would expect if CBI induces improvements in the quality of monetary policy – whereas the interaction term is positive and highly significant. One interpretation is that fiscal impulses not systematically related to output stabilization undermine the benefits of central bank independence, reflecting possible coordination failures in the policy mix. The fact that  $\hat{\phi}_3$  also turns negative when the interaction term is present could indicate that such conflicts would be the main reason for the positive conditional correlation between fiscal discretion and output volatility.

Finally, we see that the moderating impact of financial development on output volatility is robust to the introduction of our fiscal controls although that effect is mainly driven by more recent (post-1990) observations.

### 3.3 Robustness checks

We now check the robustness of our results to common econometric issues, first examining the possibility of reverse-causality, and then assessing the risk of an omitted-variable bias.

#### 3.3.1 Endogeneity

Equations (4) and (5) are potentially subject to reverse causality problems. For instance, governments concerned with output stability could arguably adjust their fiscal behavior and the size of automatic stabilizers to the intensity of exogenous disturbances affecting the economy (Rodrik, 1998). Reverse causality could also bias estimated coefficients on CBI and financial development if more volatile economies are more inclined to delegate monetary policy to an independent agency with a clear stabilization mandate, and if private agents take better advantage of financial services to self-insure against the income effect of aggregate fluctuations.

Following Fatás and Mihov (2001, 2003), we selected instruments capturing institutional and structural characteristics of countries likely to be correlated with our explanatory variables but presumably orthogonal to output volatility itself. Institutional instruments include the electoral rule (proportional vs. majoritarian), the type of political system (presidential vs. parliamentary), the presence of political constraints (number of veto points in the government), and the distribution of

Table 3

**Two-Stage-Least-Squares (2SLS) Estimates**  
(dependent variable: standard deviation of real GDP growth rate)

Instrumented Variable	Automatic Stabilizers	Cyclical Fiscal Policy	Discretionary Fiscal Policy	Financial Development	Central Bank Independence
	1	2	3	4	5
Openness	0.528 (0.83)	0.472 (0.75)	0.491 (0.74)	0.539 (0.85)	0.566 (0.79)
Automatic stabilizers	-2.271*** (-4.17)	-2.169*** (-5.11)	-1.948*** (-4.07)	-2.144*** (-5.00)	-2.802*** (-4.31)
Central Bank Independence	1.096* (1.69)	1.050* (1.75)	0.790 (1.23)	1.084* (1.80)	3.873* (1.85)
Financial Development	-0.817*** (-3.21)	-0.814*** (-3.14)	-0.971*** (-3.45)	-1.083*** (-2.61)	-0.902*** (-3.25)
Cyclical Fiscal Policy	0.125 (0.44)	0.012 (0.01)	-0.225 (-0.75)	0.166 (0.57)	0.099 (0.29)
Discretionary Fiscal Policy	0.671*** (4.22)	0.659*** (3.64)	0.322 (0.87)	0.650*** (4.15)	0.734*** (4.92)
Constant	-1.201 (-1.31)	-1.037 (-1.32)	-0.063 (-0.06)	-0.896 (-1.24)	-3.070* (-1.86)
Observations	127	127	127	127	127
R-squared	0.49	0.49	0.44	0.48	0.39
Wu-Hausman Test ( <i>p</i> -value)	0.79	0.92	0.05	0.31	0.11
Hansen J Test ( <i>p</i> -value)	0.24	0.25	0.41	0.38	0.37
Weak Identification ( <i>F</i> -stat)	27.76**	3.4	7.65	24.41**	2.55
Exogeneity Tests ( <i>p</i> -value):					
Automatic Stabilizers	...	0.9	0.72	0.75	0.53
Central Bank Independence	0.3	0.1	0.64	0.1	...
Financial Development	0.26	0.15	0.16	...	0.07
Discretionary Fiscal Policy	0.13	0.07	...	0.34	0.26
Cyclical Fiscal Policy	0.04	...	0.26	0.1	0.25

Note: Robust *t*-statistics in parentheses. Time effects are not reported. Stars denote statistical significance at conventional levels (\* for 10 per cent, \*\* for 5 per cent, and \*\*\* for 1 per cent).

ideological preferences. Other instruments are GDP per capita (at PPP, in log), the dependency ratio, the rate of urbanization, and a dummy variable identifying oil producers.

The specification used for 2SLS estimation is column 3 of Table 2. We instrumented potentially endogenous explanatory variables one by one, each time testing for the endogeneity of other suspicious instruments.<sup>15</sup> Formal exogeneity tests (Wu-Hausman, WH) only rejected the null

<sup>15</sup> Instrumenting multiple right-hand-side variables did not yield any meaningful result, in large part reflecting the weak-instrument issue discussed below.

hypothesis that OLS estimates are consistent for  $Discr_{i,t}$  (strongly) and the index of central bank independence (marginally), suggesting that 2SLS should be preferred over OLS (column 3 and 5 of Table 3). Testing for the orthogonality between each non-instrumented explanatory variable (*i.e.*, the *included* instruments) and the error term broadly support the conclusions of the WH tests.

Two-stage least-squares estimates confirm the effectiveness of automatic stabilizers (column 1 of Table 3) and the stabilizing impact of financial development (column 4), although the coefficient for the latter is somewhat higher in absolute value. The other results are difficult to interpret because instruments appear to be weak, meaning that the explanatory power of the excluded instruments in the first stage regression is too low to provide reliable identification. Hence 2SLS estimators are biased and inefficient, especially in small samples such as ours (Stock, Wright and Yogo, 2002). It is nevertheless notable that our indicator of fiscal policy discretion does not appear to significantly raise volatility when it is instrumented. This could be a sign that this indicator also reflects other sources of output volatility not captured by the statistical model, but with potentially significant budgetary consequences (e.g., commodity or asset prices, exchange rates, inflation shocks...).

### 3.3.2 Omitted variables

The omission of relevant explanatory variables could also entail a correlation between the error term and the independent variables. We thus further examine the possibility of a bias by adding potential determinants of output volatility to the baseline specification. Keeping our focus on the effectiveness of automatic stabilizers, we follow Fatás and Mihov (2001) and select controls likely to be correlated with both government size and output volatility.<sup>16</sup> None of the added explanatory variable turns out being statistically significant (neither individually nor together, as shown in Table 4), and estimates of the coefficients of interest (automatic stabilizers, discretionary fiscal policy and financial development) are not statistically different across regressions.

In a panel context, a natural test for the robustness of our results to omitted variables is to add country fixed-effects. The limited size of our sample limits our investigation to the parsimonious specifications in columns 8 and 9, which exclude the cyclical policy indicator because it has no time-series variance. The stabilizing impact of financial development does not survive this “acid test”, pointing to the possibility that some underlying, country-specific variables – perhaps “deep” institutional determinants<sup>17</sup> – jointly determine the level of financial development and macroeconomic volatility. In contrast, automatic stabilizers and discretionary policy still exhibit respectively stabilizing and destabilizing impacts on GDP growth. The interaction between CBI and discretionary fiscal policy passes the test as well, adding support to the possibility that coordination failures in the policy mix could be a key channel through which fiscal discretion increases output volatility.

### 3.3.3 Fiscal policy and private consumption volatility

While macroeconomic stabilization aims at reducing the volatility of output, welfare gains are often thought to be more closely associated with the stability of real private consumption.<sup>18</sup> Although output and consumption (real growth) volatilities are strongly correlated (unconditional

<sup>16</sup> These authors discuss in detail the motivation for each of those controls.

<sup>17</sup> See Acemoglu *et al.* (2002).

<sup>18</sup> The argument is not so clear-cut, however, because output fluctuations are likely to be more tightly related to employment, and thereby leisure.

Table 4

**Adding Control Variables**  
(Dependent variable: standard deviation of real GDP growth rate)

Item	1	2	3	4	5	6	7	8	9
Openness	0.450 (0.66)	0.807 (1.08)	0.862 (1.21)	0.910 (1.28)	0.923 (1.30)	0.844 (1.24)	0.881 (1.34)	-1.924 (-0.91)	-3.081 (-1.31)
Automatic Stabilizers	-2.067*** (-4.94)	-2.428*** (-5.14)	-2.574*** (-4.60)	-2.439*** (-4.37)	-2.426*** (-4.47)	-2.421*** (-4.17)	-2.326*** (-3.93)	-2.867** (-2.48)	-2.738** (-2.56)
Central Bank Independence	1.115* (1.85)	1.031* (1.69)	0.984 (1.58)	1.065* (1.67)	0.885 (1.33)	1.382* (1.84)	-1.931* (-1.66)	0.423 (0.66)	-1.689 (-1.26)
Financial Development	-0.782*** (-2.92)	-0.820*** (-3.03)	0.920** (-2.52)	-0.874** (-2.57)	-0.914*** (-2.75)	-0.640** (-1.95)	-0.560* (-1.63)	0.005 (0.01)	0.066 (0.14)
Cyclical Fiscal Policy	0.117 (0.39)	0.046 (0.15)	0.013 (0.04)	0.039 (0.13)	0.051 (0.16)	0.126 (0.36)	-0.015 (-0.04)	...	...
Discretionary Fiscal Policy	0.676*** (4.65)	0.642*** (4.14)	0.639*** (4.17)	0.623*** (4.20)	0.711*** (4.55)	0.831*** (5.32)	-0.187 (-0.49)	0.489*** (2.73)	-0.224 (-0.54)
Country Size (Log of GDP)	-0.018 (-0.28)	-0.007 (-0.11)	-0.006 (-0.09)	-0.008 (-0.13)	0.004 (0.06)	-0.027 (-0.44)	-0.033 (-0.59)	...	...
Mean Real GDP Growth	...	-0.131 (-1.44)	-0.132 (-1.46)	-0.117 (-1.21)	-0.113 (-1.22)	-0.081 (-0.83)	-0.105 (-1.11)	...	...
GDP per capita (PPP, in Log)	...	...	0.075 (0.39)	0.077 (0.41)	0.118 (0.68)	-0.015 (-0.08)	0.032 (0.17)	...	...
Terms-of-trade Volatility	...	...	...	0.020 (0.96)	0.023 (1.12)	0.015 (0.91)	0.010 (0.71)	...	...
Oil Dummy	...	...	...	...	-0.844 (-0.98)	-0.792 (-0.85)	-0.385 (-0.46)	...	...
Government Stability	...	...	...	...	...	-0.121 (-0.85)	-0.078 (-0.63)	...	...
Interaction: Discretion x CBI	...	...	...	...	...	...	1.783*** (2.63)	...	1.328** (2.11)
Country Fixed Effects ( <i>F</i> -test)	...	...	...	...	...	...	...	2.94**	3.41**
Constant	-0.722 (-0.41)	-0.852 (-0.48)	-1.666 (-0.64)	-1.722 (-0.65)	-2.432 (-1.01)	-0.571 (-0.22)	0.854 (0.32)	-1.05 (-0.56)	0.435 (0.21)
Observations	133	133	133	133	133	111	111	133	133
<i>R</i> -squared	0.50	0.51	0.51	0.51	0.52	0.58	0.63	0.35	0.35

Note: Robust *t*-statistics in parentheses. Time effects are not reported. Stars denote statistical significance at conventional levels (\* for 10 per cent, \*\* for 5 per cent, and \*\*\* for 1 per cent).

correlation coefficient of 0.69 in our sample), the determinants of private consumption reflect individual choices that may be more directly responsive to opportunities to smooth consumption than to fiscal aggregates. Variance-decomposition exercises performed by Debrun, Pisani-Ferry and Sapir (2008) provide some support to that presumption, showing that automatic stabilizers – income tax payments and transfers – have not contributed to the decline in consumption volatility observed since the mid-1980s.

To model private consumption volatility, we follow equation (4). The results are qualitatively comparable to those found for output volatility, but with important nuances (Table 5).



Table 5

**Fiscal Policy and Consumption Volatility**  
(dependent variable: standard deviation of real GDP growth rate)

Estimator:  Instrumented Variable:	OLS		2SLS			
	...	...	Automatic Stabilizers	Cyclical Fiscal Policy	Discretionary Fiscal Policy	Financial Development
	1	2	3	4	5	6
Openness	1.032 (1.11)	1.059 (1.19)	1.417 (1.59)	1.050 (1.10)	1.227 (1.28)	1.348 (1.43)
Automatic Stabilizers	-1.140* (-1.94)	-0.772 (-1.36)	-2.046*** (-2.61)	-1.307** (-2.08)	-1.091* (-1.63)	-1.263** (-1.99)
Central Bank Independence	0.944 (1.08)	-2.886* (-1.86)	1.637 (1.62)	1.289 (1.51)	0.958 (1.08)	1.375 (1.58)
Financial Development	-1.429*** (-2.94)	-1.196*** (-2.42)	-1.394*** (-3.15)	-1.384*** (-3.13)	-1.633*** (-3.23)	-2.228*** (-2.91)
Cyclical Fiscal Policy	-0.511 (-1.15)	-0.606 (-1.43)	-0.387 (-0.87)	-1.11 (-0.88)	-0.875* (-1.81)	-0.318 (-0.70)
Discretionary Fiscal Policy	0.525*** (2.51)	-0.606* (-1.89)	0.611*** (2.84)	0.526** (2.04)	0.162 (0.39)	0.521** (2.39)
Interaction: Discretion x CBI	...	2.118*** (2.76)	...	...	...	...
Constant	0.307 (0.28)	2.575** (2.25)	-1.028 (-0.80)	0.168 (0.13)	1.210 (0.78)	0.514 (0.44)
Observations	131	131	126	126	126	126
R-squared	0.35	0.39	0.35	0.35	0.33	0.34
Wu-Hausman Test ( <i>p</i> -value)	...	...	0.24	0.65	0.14	0.06
Hansen J Test ( <i>p</i> -value)	...	...	0.16	0.12	0.17	0.34
Weak Identification ( <i>F</i> -stat)	...	...	27.14**	3.37	7.44	23.49**

Note: Robust *t*-statistics in parentheses. Time effects are not reported. Stars denote statistical significance at conventional levels (\* for 10 per cent, \*\* for 5 per cent, and \*\*\* for 1 per cent).

First, the stabilizing effect of financial development is quantitatively large and statistically significant, confirming the important role of access to credit in providing consumption-smoothing opportunities to consumers. Second, automatic stabilizers continue to play a stabilizing role, although it is quantitatively smaller than for output (by roughly  $\frac{1}{2}$  in most regressions) and less precisely estimated. Instrumenting government size yields quantitatively similar results to the output volatility equation. However, these results are not robust to the introduction of additional control variables, even though the latter remain non-significant. Third, the discretionary dimension of fiscal policy is generally destabilizing; but simultaneity concerns remain. Fourth, the cyclical dimension of fiscal policy now consistently has the expected negative impact on consumption volatility although large estimation errors<sup>19</sup> remain. Still, the contrast with the output equations is

<sup>19</sup> Running the same regressions with the unrestricted indicator of cyclical policy indeed reduces  $\hat{\phi}_2$  and increases errors.

striking enough to suggest that systematic stabilizing actions by fiscal policymakers seem to be more effective at stabilizing private consumption, possibly because they are better targeted. Alternatively, this could indicate that our indicator of cyclical fiscal policy also captures automatic stabilizers on the expenditure side, which are by design targeted at smoothing individual consumer income. Finally, the interaction between the CBI index and our measure of the discretionary dimension of fiscal policy remains strong and statistically significant.

#### **4 Conclusions**

This paper revisits the empirical link between fiscal policy and macroeconomic volatility (output and private consumption). Our analysis is based on a sample of 49 developing and advanced economies spanning the last 40 years. Results generally provide strong support for the view that fiscal stabilization operates mainly through automatic stabilizers. By contrast, fiscal policies systematically linked to cyclical conditions – be they pro- or counter-cyclical – do not appear to have a meaningful impact on output volatility. Finally, fiscal variability not systematically related to the business cycle generally seems to increase output and consumption volatility, possibly due in part to conflicts with monetary authorities. However, these latter two results may suffer from a simultaneity bias because certain sources of budgetary volatility (e.g., exchange rate, or inflation) are correlated with output volatility. Outside fiscal policy, financial development seems to exert a moderating influence on income and, even more so, on consumption growth, but robustness analysis indicates that it may proxy the role of other country-specific features not included in our analysis. As regards monetary policy, central bank independence is associated with lower volatility, provided that the interaction between monetary and fiscal policies is taken into account.

The analysis contributes to the relevant literature in two ways. First, we show that the effectiveness of automatic stabilizers extends well beyond the narrow sample of 20 OECD countries explored by Fatás and Mihov (2001) and apply with equal strength to a broader set of highly heterogeneous countries, including developing economies. Second, our robustness tests strike a note of caution on the causal nature of the relationship between discretionary policy activism and output volatility (Fatás and Mihov, 2003).

Broader policy implications emerge. First, fiscal policy is unambiguously effective at durably stabilizing the economy when it operates in the same way as automatic stabilizers (in a timely, reasonably predictable and symmetric way). Second, governments could also contribute to macroeconomic stability by subjecting the pursuit of other objectives (redistribution or efficiency) to a “stability test.” Our results indeed suggest that a conscious effort to reduce conflicts among public finance objectives and between monetary and fiscal policies could reduce output volatility. One practical way to do so is to subject budget preparation to quantitative objectives or even binding constraints defined in terms of a structural balance or expenditure ceilings.

That said, an exclusive reliance on automatic stabilizers as the channel of fiscal stabilization has limits and potential drawbacks. In terms of the limits, recent experience suggests that government revenues endogenously respond to asset price cycles not necessarily synchronized with the business cycle. The induced swings in commonly estimated structural budget balances may be difficult to sustain politically, leading to pro-cyclical fiscal expansions when structural surpluses appear substantial (Alesina, 2000). Also, automatic stabilizers may be insufficient in case of acute crises, or when other policy instruments or consumption smoothing opportunities are constrained.

In terms of the drawbacks, the fact that large stabilizers come with large government sectors may adversely affect potential growth and the economy’s resilience to shocks; and as our analysis suggests, it could also increase the likelihood of destabilizing fiscal shocks. In light of these limits

and drawbacks, a number of proposals to enhance fiscal stabilizers without increasing the size of government have been made. For instance, given the difficulty to design effective fiscal stimulus plans and the incomplete credibility of subsequent consolidations, automatic adjustments in selected tax rates or expenditure programs could be envisaged (see Baunsgaard and Symansky, 2009, for a survey and an assessment).

Looking forward, further research will need to address a number of pending issues. First, we see a need to explore more systematically the apparently strong impact of monetary-fiscal conflicts on macroeconomic volatility, as this could have important implications for the design of macro-fiscal frameworks. In particular, alternative measures of the quality of monetary policy should be envisaged. Second, we ignored the impact of expenditure and revenue composition on the size of fiscal stabilizers, possibly introducing measurement errors. Third, and related, more work is needed to improve measures of automatic stabilizers – particularly to have a better grasp of the role of expenditure composition – and of fiscal discretion.

## APPENDIX

### Data Sources

Data on government size (general government expenditure as a percentage of GDP), GDP per capita, openness to trade, public debt (percentage of GDP), private consumption, dependency ratio and urbanization rates are obtained from the IMF World Economic Outlook Database. Financial development, which is captured by the total stock of credit by deposit money banks to private sector as percentage of GDP, and indices of oil prices are obtained from the IMF International Financial Statistics. Data on political and electoral systems is from the Database of Political Institutions (Beck *et al.*, 2001). The political constraint index is from the POLCON database (Henisz, 2006). The index of government stability is from the International Country Risk Guide database. The index of Central Bank Independence is from Crowe and Meade (2008).

### Automatic stabilizers, fiscal multipliers and $\hat{\phi}_1$

It is useful to illustrate the link between our estimates of the impact of automatic stabilizers and conventional measures of fiscal policy effectiveness. For simplicity, the starting point is a log-linear, backward-looking IS equation:

$$y = \lambda y_{-1} + \gamma_0 d - \gamma_1(i - \pi^e) - \gamma_2(e + \pi - \pi^*) + \gamma_3 y^* + \varepsilon \quad (\text{A.1})$$

$$\text{with } 0 < \lambda < 1 \text{ and } \gamma_0, \dots, \gamma_3 > 0$$

where the output gap<sup>20</sup>  $y$  depends on the government budget deficit  $d$ , the real interest rate, the real exchange rate, external demand, and a random disturbance (all these with obvious notations). The decomposition between the cyclical and the cyclically-adjusted deficit ( $d^s$ ) can be written as:  $d = d^s - \alpha y$ , where  $\alpha > 0$  denotes the sensitivity of the budget deficit to the output gap. The cyclically-adjusted deficit itself reflects the cyclical policy and a residual:  $d^s = -\beta y + \mu$ , with  $\beta > 0$ . Hence,  $d = -(\alpha + \beta)y + \mu$ . Substituting for the budget deficit, we can write the long-run relationship ( $y = y_{-1}$ ) as follows:

$$y = \frac{1}{(1 + \gamma_0(\alpha + \beta) - \lambda)} [\gamma_0 \mu - \gamma_1(i - \pi^e) - \gamma_2(e + \pi - \pi^*) + \gamma_3 y^* + \varepsilon] \quad (\text{A.2})$$

Clearly, greater automatic stabilizers, a more countercyclical discretionary fiscal policy and a greater fiscal multiplier all contribute to offset IS shocks:

$$\frac{\partial y^2}{\partial \alpha} = \frac{\partial y^2}{\partial \beta} = \frac{-\gamma_0}{(1 + \gamma_0(\alpha + \beta) - \lambda)^2} < 0, \quad \frac{\partial y^2}{\partial \gamma_0} = \frac{-(\alpha + \beta)}{(1 + \gamma_0(\alpha + \beta) - \lambda)^2} < 0$$

To illustrate how these fiscal policy parameters relate to the estimated impact of automatic stabilizers on output volatility in the empirical model, let us write the variance of the output gap as:<sup>21</sup>

$$\text{Var}(y) = \left( \frac{1}{(1 + \gamma_0(\alpha + \beta) - \lambda)} \right)^2 \text{Var}(\xi)$$

<sup>20</sup> A similar relationship can be assumed to hold for the log of output.

<sup>21</sup> The same expression applies to the first difference of the output gap.

$$\text{with } \xi = [\gamma_0 \mu - \gamma_1 (i - \pi^e) - \gamma_2 (e + \pi - \pi^*) + \gamma_3 y^* + \varepsilon]$$

This implies:

$$\frac{\partial Sd(y)}{\partial \alpha} = \frac{-y_0}{(1 + \gamma_0(\alpha + \beta) - \lambda)^2} Sd(\xi) < 0, \text{ and } \frac{\partial Sd(y)^2}{\partial^2 \alpha} = \frac{2y_0^2}{(1 + \gamma_0(\alpha + \beta) - \lambda)^3} Sd(\xi) > 0$$

Stronger automatic stabilizers thus reduce the standard deviation of the output gap, but at a decreasing rate because stabilizers themselves run against the potency of exogenous fiscal impulses. This second-round effect likely explains why using the logarithm of government size (instead of its level) generally yields better statistical results. The link between  $\hat{\phi}_1$  and the fiscal policy parameters can be written as:

$$\phi_1 = \frac{\partial Sd(y)}{\partial \log(\alpha)} = \frac{\partial Sd(y)}{\frac{1}{\alpha} \partial \alpha} = \frac{-\alpha y_0}{(1 + \gamma_0(\alpha + \beta) - \lambda)^2} Sd(\xi) \quad (\text{A.3})$$

Using equation (A.3), we can determine a range of values for  $\hat{\phi}_1$  consistent with plausible calibration of the various parameters. As  $Sd(\xi)$  is not observable, we simply assume – in line with recent empirical estimates<sup>22</sup> – that fiscal policy can stabilize about one third of shocks to  $\xi$ . We thus set  $Sd(\xi)$  equal to 1.5 times our sample's measure of output variability. Assuming<sup>23</sup> that  $\lambda = 0.6$ , that  $\gamma_0$  spans over  $[0.1; 1.5]$  and that government size can be anywhere between 0.2 and 0.6, the implied values for  $\phi_1$  lies between  $-2.64$  and  $-0.48$ . We can also use equation (A.3) to calculate, for given government size, the range of values of fiscal policy multipliers implicit in our estimates of  $\phi_1$ . Taking the sample average of government size of 0.38 and assuming that discretionary fiscal policy is acyclical ( $\beta > 0$ ), the 95 percent confidence interval of  $\phi_1$  (*i.e.*  $[-2.81; -1.22]$ )<sup>24</sup> maps into “fiscal multipliers”  $((\gamma_0) (1 + \gamma_0(\alpha + \beta) - \lambda)^{-1})$  between 0.4 and 1.5. Replicating this exercise for the 95 percent confidence interval of  $\phi_1$  using the standard deviation of the output gap as the measure of volatility (*i.e.*  $[-2.29; -0.92]$ ), we obtain somewhat lower multipliers (between 0.4 and 1.0).

<sup>22</sup> For recent evidence, see Dolls, Fuest and Peichl (2009).

<sup>23</sup> The value for the persistence parameter was set on the basis of the average value obtained in straightforward OLS estimations of equation (A.1) for a variety of advanced countries in our sample.

<sup>24</sup> This refers to the regression (3) in Table 2 of the main text.

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# FISCAL STABILISATION PLANS AND THE OUTLOOK FOR THE WORLD ECONOMY

Patrick Van Brusselen\*

*The topic of counter-cyclical fiscal policies has been put squarely under the spotlights since the outbreak of the current world-wide financial and economic crisis in September 2008. As governments have devised billion dollar stimulus packages, debates have raged in both the media and academia surrounding the effectiveness of such measures. This paper brings together material written on fiscal stabilisation plans in 2009 and a more recent macroeconomic projection for the world economy, which was made in early 2010. It attempts to provide an overview of the theory and empirical evidence on the effects of fiscal policies, placed in the current context of global recession and financial distress. It then goes on to address the question of where the world economy is headed given the now generally unsustainably high levels of public sector deficits and debt and given the possibility that the global financial crisis will have lasting adverse effects on potential output levels. This text is a very much abridged version of the full paper (80 pages in length) that was presented at the Bank of Italy's Fiscal Policy Workshop, held in Perugia on 25-27 March 2010. The full paper can be obtained upon simple email request sent to the author.*

## 1 Economic stabilisation policies in theory

### 1.1 The basic fiscal policy setup

During the Great Depression years of the 1930s, John Maynard Keynes explained that the cause of the high unemployment was insufficient demand. Aggregate demand had fallen to a level below that necessary to ensure the full and optimal utilisation of the economy's productive capacities, in terms of both labour and capital utilisation. Left to themselves, economies could remain in such a state of insufficient demand indefinitely. The answer to this deficiency was for the government to boost demand and bring the level of aggregate demand up to the level of optimal aggregate supply, thus ensuring full employment and stable inflation.

Government intervention in the economy happens through both the expenditure side and the income side. On the expenditure side, government outlays are, in part, linked to mechanisms laid down in laws. These public expenditures are commonly referred to as non-discretionary or entitlement spending. Other spending items are called discretionary, because governments can decide to change the level of spending on these items without going through changes in legislation. Most income is usually raised through taxation rates, which are usually laid down in laws and are thus non-discretionary.

Changes in the business cycle have a direct influence on government income and expenditure levels, even without any changes in discretionary spending. Indeed, in a recession, unemployment levels rise and lead to automatic increases in unemployment benefits paid out. This in turn tends to mitigate the effect of the cyclical downturn on income and employment. Similarly, a recession can lead to a decline in household incomes and push households into lower average tax brackets. This tends to increase after-tax incomes and mitigate the effect of the cyclical downturn on income and employment, while leading to reduced tax receipts for the government.

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However, alongside the working of the government's automatic fiscal stabilisers, a government can also intervene directly in the economy through discretionary fiscal policy, enhancing or counterbalancing the effects of automatic stabilisers.

## 1.2 *Insights from the Hicksian IS-LM analysis*

In discussing the effectiveness of monetary and fiscal policy, two polar cases can be analysed in the standard Hicksian IS-LM framework. In this framework, recall that the IS curve or schedule represents the combinations of interest rates and aggregate output levels for which the goods market is in equilibrium. It is negatively sloped because a higher level of the interest rate reduces investment spending. The LM curve represents the combinations of interest rates and aggregate output levels for which real money balances (and the bond market) are in equilibrium. It is positively sloped because a higher level of the interest rate reduces the demand for real money balances and an increase in aggregate income raises the demand for real money balances.

First, there is the *classical case* in which the LM curve becomes vertical. A vertical LM schedule signals that demand for real money balances is completely insensitive to the interest rate. This is called the classical case because it represents the situation corresponding to the *quantity theory of money*, which states that for a given price vector, the level of real output is completely determined by the supply of nominal money balances. In this situation, fiscal policy is completely ineffective in stimulating the economy while monetary policy can have a maximum effect on output. Indeed, an increase in the money supply shifts the LM schedule out to the right, leading to a strong increase in output and a parallel decline in the interest rate. An increase in government expenditure, which shifts the IS curve up and to the right, would lead to a complete crowding out of private spending, thus pushing up the interest rate and leaving the output level unchanged.

Second, there is the case of the *liquidity trap*, in which the LM curve becomes horizontal and where changes in the quantity of money are unable to shift it. In this case, households are prepared to hold any amount of real money balances rather than increase their portfolio balance of less liquid bonds. Changes in the stock of money in circulation have no effect on the LM curve, implying that monetary policy no longer affects the interest rate, no longer affects investment and savings decisions, and no longer affects output and income. This is the situation that presents itself when nominal interest rates fall to their zero lower bound. Households then prefer to hold cash balances rather than invest in less liquid bonds that yield zero interest. Note that an economy can also find itself in a liquidity trap with a positive interest rate, as in the case of a seizing up of credit linked to increased perceptions of market or counterparty risk. If this situation leads to lower private final demand, fiscal policy can be relatively potent, as an increase in government spending will not lead to any significant crowding out of private consumption and investment.

Having reviewed the potential for economic stimulus through fiscal policy in the case of the *classical model* and in the case of a *liquidity trap*, we now turn to a summary analysis of fiscal policy in the usual IS-LM framework. An increase in government spending or a decline in taxation brings about an increase in both output and in the interest rate. For any rise in public spending, equilibrium output must rise by the change in spending multiplied by the value of the fiscal spending multiplier. In an open economy operating in a flexible exchange rate regime, the rise in the interest rate would lead to a rise in the external value of the country's currency and to a deterioration in the country's current account balance. In the absence of any crowding out and upward pressure on the interest rate, the economy's equilibrium output would rise unambiguously.

### *1.3 Bridging the divide with the New Keynesian perspective*

In a noteworthy attempt to breach the divide that has appeared between various strands of macroeconomic approaches since the beginning of the global financial crisis, recent literature has indicated that though differences do exist between more traditional Keynesian and the New Keynesian approaches, these differences can often be largely explained in terms of modelling assumptions.

Indeed, recent research indicates that even in the framework of a modern, state-of-the-art New Keynesian macroeconomic model, the basic findings of the more traditional Keynesian perspective on the usefulness of public stabilisation policies still hold (Woodford, 2010). This research indicates that both monetary and fiscal policies are essential policy tools, but that their effectiveness is state-dependant, that it changes with their degree of coordination, and that timing and expectations matter. The New Keynesian macroeconomic models would produce government spending multipliers of around unity when monetary policy is coordinated with fiscal policy, ensuring that real interest rates do not rise. If monetary policy does not stabilise real interest rates and if the economy is operating around its potential output level, real interest rates would rise and the public spending multiplier would fall below one, possibly even becoming nil or negative. The multiplier can however be significantly larger than one in these models, inasmuch as the economy is operating below potential and if monetary authorities act to reduce real interest rates. The research finds that a large public multiplier is to be expected in the case where the nominal interest rate falls to the zero lower bound, as the higher inflation generated by public spending would reduce the real interest rate.

The research also attempts to shed light on the question of the optimal size of discretionary public spending plans in the face of a recession, supporting the view that the optimal size of a public stabilisation plan depends on the output loss relative to the economy's potential and on perceptions as to the timing and duration of the increase in public spending. Indeed, confirming other recent findings (Krugman, 2008), the research indicates that the larger the negative output gap, the larger the optimal policy response: the fiscal stabilisation package should go a long way in closing the output gap if the gap is large, but should remain much more limited in the case of a less pronounced or cyclical downturn. At the same time, the effectiveness of a public spending programme depends on the duration of the rise in spending. If the increase in public spending is expected to persist even after a recovery in private sector output, the expected increase in real interest rates would once again reduce the potency of the fiscal stabilisation plans.

## **2 Optimal design of fiscal stabilisation programmes**

Standard economic theory indicates that in situations where there exist developed and functioning financial markets and an independent central bank with the appropriate know-how, monetary policy is usually the best response to an effective or anticipated downturn in economic activity, due to the speed with which monetary authorities can modify market interest rates. Even though it may take several quarters before the full impact of a change in the monetary policy stance is felt in the economy, the first effects materialise quite rapidly and implementation lags are, in any case, shorter than those usually associated with budgetary processes.

In all cases, an economic downturn will also lead to an autonomous counter-cyclical fiscal policy through the working of the automatic fiscal stabilisers. However, if the expected downturn appears to be particularly sudden and large, there is a case that can be made for an accompanying expansionary and discretionary fiscal policy. This is particularly relevant in situations where monetary authorities have all but exhausted the scope for conventional monetary policy intervention through reductions in policy interest rates. It has also been shown to be the optimal

response in the face of uncertainty as to the true impact of monetary and fiscal policy options. Furthermore, recent research indicates that an active discretionary fiscal policy based on counter-cyclical public spending can be more important for growth than a fiscal policy based only on automatic fiscal stabilisers.

When monetary policy is deemed insufficient to stabilise the economy on its own, or in the case of a liquidity trap, an expansionary fiscal policy should be devised so as to correspond to a number of basic principles. There are the now well-known three “Ts”: an expansionary fiscal policy should be timely, targeted and temporary (Elmendorf and Furman, 2008). Then, there are the three “Cs”: an expansionary fiscal policy should also be contingent, credible and coordinated.

All in all, poorly crafted fiscal stabilisation packages might result in too little economic boost coming too late, and lead only to rising interest rates and increased public borrowing and debt. In this case, having no fiscal stimulus could be better than a badly thought-out stimulus plan, in limiting the present value of the sum of current and future output losses.

### **3 Empirical evaluations of fiscal multipliers**

The following section presents the values of fiscal multipliers that are found through the historical narrative record method, through the analysis of the impulse-responses of variable auto regressive models and through macroeconomic model simulation experiments.

Evidence on multipliers from empirical macroeconomic models leads to a number of important conclusions. Looking at all the results compiled from narrative records, VAR impulse-responses, econometric models and general equilibrium models, the range of multipliers is very wide indeed. Government spending multipliers vary between  $-3.8$  and  $+3.8$ ; tax cut multipliers vary between  $-4.8$  and  $+3.0$ .

Results vary most widely for multiplier estimates derived from VAR models. However, it has been shown that estimates are very sensitive to specifications and assumptions in all types of empirical models. Studies have highlighted the important role of the monetary policy reaction function in multiplier evaluations, underscoring the necessity of coordination between fiscal and monetary policies.

Results also indicate that exchange rates play a crucial role in open-economy models, underscoring here the importance of international policy coordination. Finally, another set of model features or assumptions are found to be crucial in deriving multiplier estimates; these are linked to the way the model handles liquidity constraints, credibility issues regarding long-term fiscal balance, forward-looking behaviour and rationality issues.

### **4 An evaluation of the effects of the euro area recovery plan of 2008**

This section presents a tentative evaluation of the national Recovery Plans put forward by individual EU governments in the wake of the European Commission’s Recovery Plan proposal. The macroeconomic effects of the effective implementation of these plans have been evaluated with the NIME model. The main effects of the implied Euro area Recovery Plan are presented in terms of deviations from a baseline scenario that does not include these measures.

The European Commission’s *European Economic Recovery Plan* of 26 November, 2008, called for the swift implementation of a public spending and/or tax cut programme of roughly 1.5 per cent of the EU’s GDP (Commission, 2008). This would come in the form of various types of aid for business investments (e.g., through direct aid and loan guarantees), other public works

Table 1

## Range of Fiscal Multiplier Estimates for the US

Item	Narrative Record Models		VAR/SVAR models		Econometric Models		GE / DSGE Models	
	Low	High	Low	High	Low	High	Low	High
Public spending multipliers	1.0	1.4	-3.77	3.68	-0.6	1.6	0.0	3.9
Tax cut multipliers	-	3.0	-4.75	2.64	-0.4	1.3	-2.63*	-0.23*

\* Results for a large economy from the IMF's Global Fiscal Model (see Botman *et al.*, 2006).

programmes, tax cuts aiming to boost consumption expenditure, and cuts in social security contributions aiming to boost labour demand. The recovery plans could allow EU Member States to engage in temporary fiscal stabilisation (deficit spending) and increase their budget deficits without violating the terms of the EU's revised Stability and Growth Pact, as the Pact's "exceptional circumstances" clause allows countries to post temporary and limited budget deficits<sup>1</sup> as long as their medium-term cyclically-adjusted budgetary position is projected to return to balance or surplus.

On 2 December, 2008, the EcoFin Council approved the Commission's proposed Recovery Plan, based on a proposal of an overall 1.5 per cent of GDP, EU-wide fiscal stimulus package. By late February 2009, the sum of fiscal stimulus (public spending and tax cut) measures put forward by EU governments was estimated to reach 106 billion euros at the level of the 27 EU Member States (Saha and Von Weisäcker, 2009). If one adds to this figure the 263.8 billion euros in measures put forward in the form of government loan and credit guarantees for non-financial enterprises, one comes up with a total EU-wide commitment of 369.8 billion euros. For the euro area<sup>2</sup> (Euro-12), direct fiscal measures are estimated to total 73 billion euros. Additional credit and loan guarantees to non-financial corporates could provide another 169.85 billion euros, leading to a grand total of 271.6 billion euros or 3 per cent of the estimated nominal GDP of 2008 at the Euro-12 level.

Though the total figure of 369.8 billion euros budgeted in the framework of the economic recovery plans of the 27 EU Member States is impressive, a large part of this sum consists of credit and loan guarantees extended by national governments to the non-financial corporate sector. These guarantees and credit lines constitute large contingent liabilities for governments; however, a figure for an effective fiscal stimulus which includes this support most likely overestimates the true impact of the stimulus plans in terms of their potential impact on real economic output and employment.

In view of assessing the potential real output effects of these plans, we assume that the effective stimulus consists of the announced fiscal spending and tax cut measures, to which we add half of the amount budgeted under the heading of credit lines and loan guarantees to the

<sup>1</sup> See Article 1 of Council Regulation (EC) No 1056/2005 on exceptional excessive deficits.

<sup>2</sup> The NIME model's "euro area" comprises the following twelve countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Spain and Portugal.

Table 2

**Main Effects of the Euro Area Economic Recovery Plan**  
*(deviations from baseline level in percent, except where otherwise noted)*

Item	2009	2010	2011	2012	2013	2014	2015
Real GDP	0.77	0.62	0.45	0.31	0.19	0.11	0.06
Real private consumption	0.23	0.18	0.10	0.05	0.00	-0.04	-0.08
Employment	0.14	0.11	0.06	-0.02	-0.07	-0.10	-0.10
Employment (difference, thousands of persons)	200	163	84	-25	-107	-150	-149
Consumer price inflation rate (difference, percent)	0.00	0.22	0.50	0.76	0.99	1.19	1.35
Nominal short term Interest rate (difference, percent of GDP)	0.17	0.34	0.44	0.47	0.44	0.39	0.33
Nominal effective exchange rate	-0.20	-0.58	-1.00	-1.49	-1.90	-2.18	-2.35
Fiscal position (difference, percent of GDP)	-0.60	-0.67	-0.75	-0.85	-0.92	-0.98	-1.03
Current account position (difference, percent of GDP)	-0.19	-0.21	-0.28	-0.37	-0.46	-0.53	-0.58

No international fiscal policy coordination: fiscal stimulus is simulated within the Euro-12 area only.

Short-term interest rates are endogenously determined by a Taylor-type rule.

Exchange rates are endogenously determined by an uncovered interest parity condition; a minus (-) sign indicates currency appreciation.

No long-run fiscal solvency rule is imposed.

non-financial business sector. For the Euro-12 area, this leads to a total effective economic stimulus package of 157.93 billion euros, representing 1.7 per cent of the Euro-12's nominal GDP of 2008.

In evaluating the macroeconomic effects of the euro area economic recovery package, we assume the presence of both inside and outside implementation lags, leading to a spend-out schedule in which one half of the package impacts the economy in 2009 and the remaining half affects the Euro-12 economy in 2010. For the sake of simplicity, we assume that the entire increase in public spending comes in the form of increased consumption of goods and services and that the reductions in taxes take the form of temporarily lower taxes on labour income. In both cases, we opt for policy measures that are associated with what can be viewed as relatively high short-run multiplier effects; the simulation thus arguably provides an upper bound on the macroeconomic effects that can be expected from the NIME model for the Euro-12 economic stabilisation plan.

Finally, the recovery plans are simulated using a baseline projection that corresponds to a projection of the world economy in the current economic environment. This allows the macroeconomic effects of the stimulus plan to capture possible state-dependant effects from prevailing low inflation, low – but still positive – nominal short-term interest rates, rising unemployment, and rising household saving rates in the Euro-12 area.

The main macroeconomic effects of the euro area fiscal stabilisation plan are presented in Table 2. In the first year of its implementation, the plan would raise Euro-12 GDP by 0.77 per cent with respect to the baseline. The initial effect of the euro-12 recovery plan would be to increase private sector output, creating about 200 thousand jobs in response to the rise in public consumption. The ensuing rise in household income then goes on to raise private consumption expenditure.

The second half of the stimulus package affects the economy in 2010, raising GDP by 0.62 per cent. This lesser impact is due to a number of factors. First, the somewhat higher inflation reduces the size of the real amount of stimulus in 2010. Secondly, a larger part of the stimulus package leaks out in the form of higher real imports, which produce a deterioration in the area's current account balance. Finally, the fiscal stimulus leads to a slight increase in nominal interest rates as the area's negative output gap is reduced and as inflation picks up.

Over the period 2011-15, the effects of the stimulus package on output decline, and real GDP gradually falls back toward its baseline level. As of 2012, higher inflation, higher interest rates and import leakages reverse the initial employment gains. The area's fiscal position deteriorates by a full percentage point of GDP while the area's current account deteriorates by 0.58 percentage points of GDP.

## **5 Where is the world economy headed? Insights from a model-based medium-term projection**

In this section, a tentative projection for the world economy is proposed for the period 2010-18. Though there are an unusually high number of risks and uncertainties surrounding the unwinding of the global financial and economic crises, the NIME model is used to project a baseline scenario for the world economy over the coming years, conditional to a number of technical assumptions. NIME is a macroeconometric model with microeconomic foundations for consumption and investment decisions, short-run wage and price stickiness, stock-flow interactions and a long-run supply-driven "steady-state" equilibrium. The projection indicates that although fiscal stimulus plans will undoubtedly provide a temporary boost to world output, they will also most likely prove to be insufficient to prevent a sharp decline in real GDP growth rates and will not allow the major economies of the world to escape falling into a period of very low rates of inflation.

### *5.1 Evolution of the structural variables underlying the euro area economy*

The results of the macroeconomic projection are determined in part by the model's reactions to past cyclical conditions, and in part by the model's long-run structural trends. While the short run is mainly determined by cyclical movements, the fundamental determinants of the projection's medium-term results are to be found in such variables as the evolution of an area's demographics, the evolution of hours worked per person, the evolution of trend hourly labour productivity and structural unemployment.

Table 3 presents the evolutions of the structural variables underlying the projection results for the euro area. Strikingly, it indicates that all of the core determinants of trend real private sector output are projected to lead to reduced growth rates of real output and GDP over the 2010-18 period.

Over the 1997-2007 period, demographics made a positive contribution to euro area growth. Indeed, over that period, total population increased at an annual average rate of 0.5 per cent.

Table 3

## The Euro Area: Main Structural Developments Underlying the Projection Results

Item	Average 1997-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010-18
1. Population	<b>0.5</b>	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	<b>0.2</b>
2. Working-age population	<b>0.3</b>	0.4	0.3	0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	<b>-0.1</b>
3. Trend labour supply ( <i>persons</i> )	<b>0.9</b>	0.8	0.6	0.5	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	<b>0.2</b>
4. Trend hours worked per person, private sector	<b>-0.5</b>	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	<b>-0.5</b>
5. Trend total hours worked, private sector	<b>0.7</b>	0.5	-0.3	-0.9	-1.0	-0.2	0.1	0.1	0.2	0.1	0.0	-0.1	<b>-0.2</b>
6. Trend hourly labour productivity, private sector	<b>2.0</b>	1.2	-2.0	2.0	1.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	<b>0.8</b>
7. Trend private sector potential output	<b>2.7</b>	1.6	-2.4	1.1	0.5	0.3	0.6	0.6	0.7	0.6	0.5	0.4	<b>0.6</b>
8. Trend inflation rate (consumption deflator)	<b>1.8</b>	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	<b>1.7</b>
9. Structural rate of unemployment ( <i>level</i> )	<b>8.2</b>	8.1	8.1	8.5	9.0	8.8	8.6	8.5	8.4	8.3	8.2	8.2	<b>8.5</b>

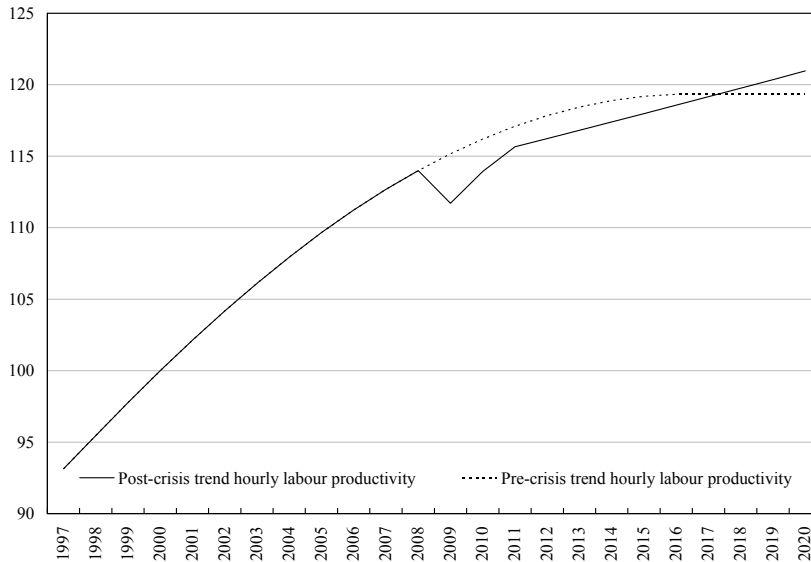
All figures reported are year-on-year growth rates of yearly averages, unless otherwise specified.

Population growth temporarily reached 0.7 per cent in 2004 but has since been in steady decline. Population is expected to have increased by just 0.4 per cent in 2009 and growth rates are projected to fall to no more than 0.1 per cent per annum by 2015. The working-age population fared worse than total population: the working-age population increased on average by 0.3 per cent per year over 1997-2007, but growth is expected to have fallen to just 0.3 per cent in 2009. The level of the working-age population should remain more or less flat in 2010-11 and decline as of 2012. The area's labour supply fared somewhat better over the recent past, rising at an annual average rate of 0.9 per cent over 1997-2007. The labour supply is expected to have increased by 0.8 per cent in 2008 and 0.6 per cent in 2009 and is projected to expand at an annual average rate of 0.2 per cent over 2010-18.



**Figure 1**

**Euro Area Private Sector Hourly Labour Productivity**  
(index of trend, year 2000=100)

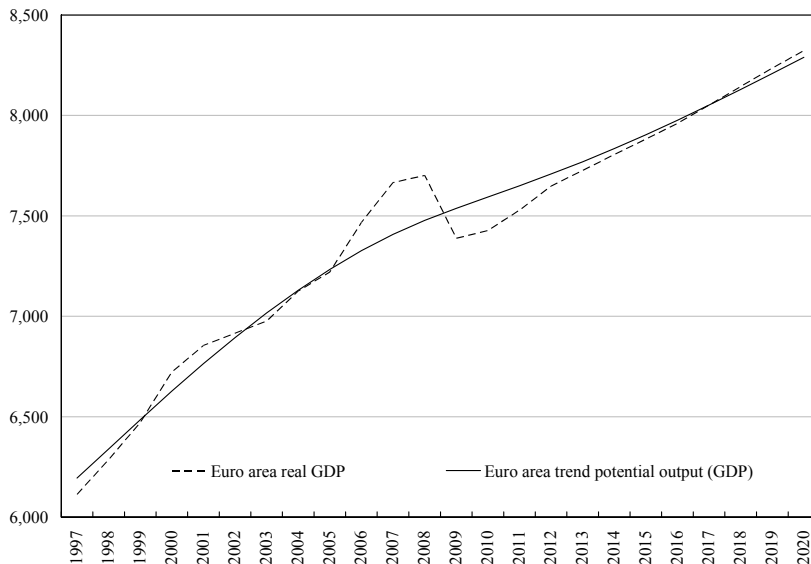


Total hours worked per person employed in the private sector followed a marked trend decline of  $-0.5$  per cent per year over the 1997-2007 period. This steadily declining trend has been apparent since at least the early 1970s and is assumed to persist through 2018.

As for private sector trend labour productivity growth,<sup>3</sup> Table 3 indicates that trend productivity increased at an annual average rate of 2 per cent over 1997-2007. However, this average figure hides the fact that trend private sector labour productivity growth was gradually declining, from 2.6 per cent growth in 1997 to just 1.3 per cent in 2007. Labour productivity growth is estimated to have subsequently fallen to 1.2 per cent in 2008. Then, due to the specific effects that the global financial crisis<sup>4</sup> (GFC) is thought to have had on such factors as investment, capital utilisation rates and government-backed labour hoarding schemes in 2009, productivity is expected to have declined by 2 per cent in 2009. After 2009, it is assumed that labour

**Figure 2**

**Euro Area Output Gap Projection**  
(levels, billions of chained (2000) euros)



<sup>3</sup> Private sector labour productivity, measured in terms of units of real output per hour of labour services, is our preferred indicator of the evolution of euro area labour productivity, due to the methodological and practical difficulties involved in attempts to arrive at an economically relevant and accurate measure of deflated non-market public sector output and productivity.

<sup>4</sup> The term "global financial crisis" refers to the difficulties that the world economy faced as of August 2007, linked to the outbreak of global financial market turmoil and world-wide downturns in economic activity.

productivity will regain some of the lost ground, rising by 2 per cent in 2010 and 1.5 per cent in 2011, as the private sector cuts costs and rationalises its production processes in order to expand output and increase profit margins. However, these relatively robust increases in labour productivity are assumed to be only a short-term burst, as labour productivity is further assumed to settle on a new trend growth rate of 0.5 per cent per year over the 2012-18 period. As shown in Figure 2, this positive, albeit historically low, rate of trend labour productivity growth, in combination with the trends that are assumed for the labour supply and for hours worked per person, will, however, ensure that the euro area's output gap closes by the end of the projection period.

The subject of the trend rate of labour productivity growth after the onset of the GFC continues to be the object of much debate, but it seems that a relatively wide consensus has formed around the notion that labour productivity in the euro area will have declined significantly in the immediate aftermath of the global financial crisis. The line of reasoning is that the crisis will durably affect the cost and availability of private funds for investment, thus reducing the number of investment projects that remain profitable and that are effectively financed. This could then affect the area's overall rate of technological progress and innovation, leading to lower rates of output growth than would have been observed had capital been more easily available.

Furthermore, it is thought that the GFC will also have significant and persistent effects on the labour market, as college graduates face greater difficulties in finding first-time jobs and as workers lose their positions, thus letting valuable human capital depreciate. The loss in human capital is expected to persist throughout the projection period, as relatively low GDP growth through 2018 pushes up unemployment and leads to longer spells of unemployment, which are typically associated with a loss of skills and an increase in structural unemployment. Table 3 indicates that the current economic crisis is expected to raise the structural rate of unemployment from 8.1 per cent of the labour force in 2008 to 9 per cent in 2011. The structural unemployment rate should then gradually decline, reaching 8.2 per cent by 2018, thanks to a steady decline in the working-age population and a slower expansion of the labour supply.

## *5.2 The outlook for the euro area over the 2011-18 period*

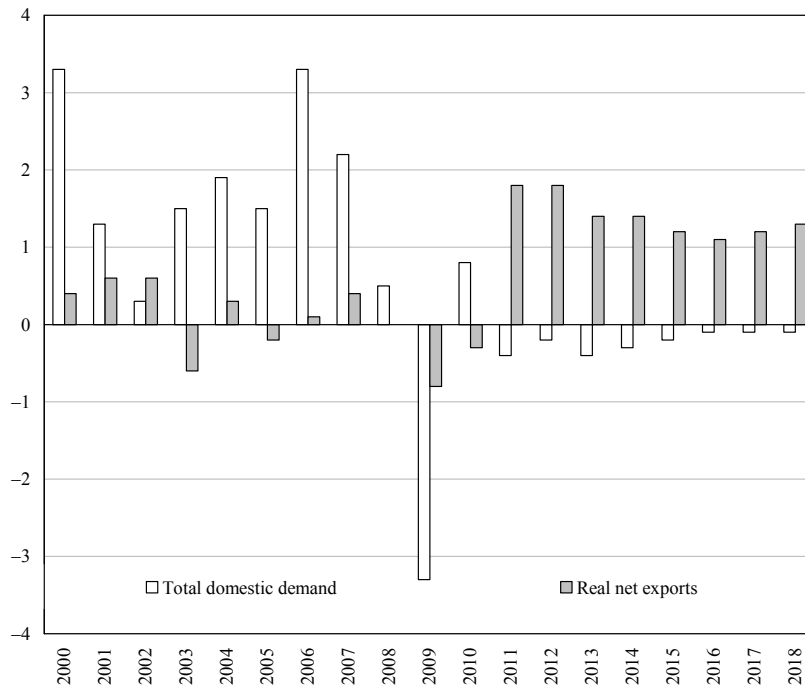
Over the 2011-18 period, the euro area's potential real GDP is projected to rise at a yearly average rate of about 0.8 per cent. As indicated in Table 3, this should come mainly from a rise in trend hourly labour productivity, with a marginal contribution from an increase in the labour supply, while the declining trend of hours worked per person per year will continue to weigh negatively on potential output, as it has done at least since the early 1970s.

Real GDP growth is projected to pick up significantly in 2011 and 2012, progressing by respectively 1.4 per cent and 1.6 per cent over the year. At the same time, total final domestic demand should fall, led by significant declines in both private consumption expenditure and household investment in residential buildings. Hence, the rise in real GDP can only be attributed to the strong upswing in real net exports.

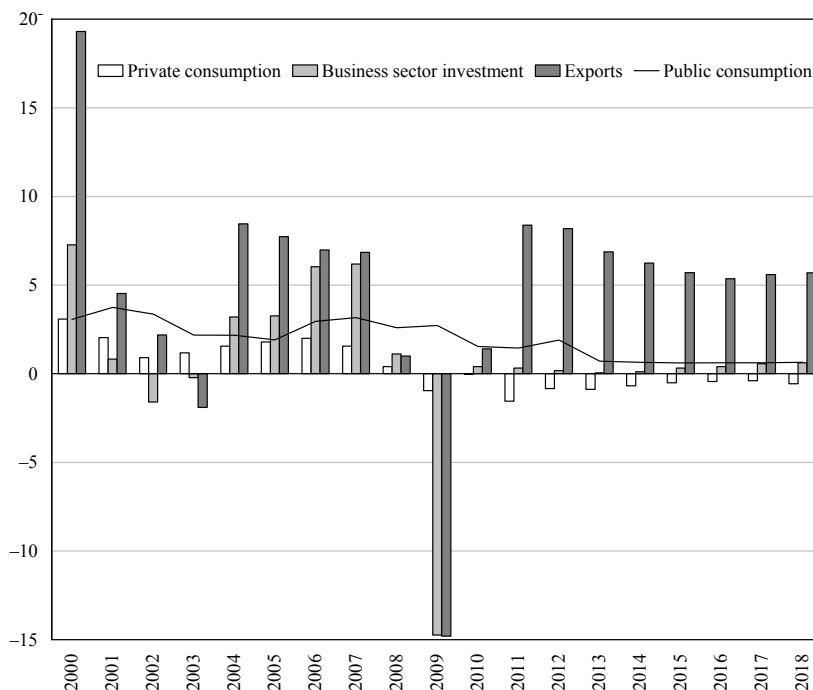
Though private consumption levelled out in 2010 thanks to the massive support for final demand from both fiscal and monetary policy, household expenditure is projected to resume its decline as of 2011; this decline should then extend right through to the end of the projection period. Household consumption is negatively affected by the massive decline in the volume of labour services demanded over the 2009-11. This reduction in the demand for labour combines with a significant decline in hours worked per person and, at best, modest increases in real wage rates to limit the rise in household real disposable income and to raise the household saving rate.

**Figure 3**

**Contributions to Real GDP Growth in the Euro Area**  
(percent)

**Figure 4**

**Selected Components of Demand in the Euro Area**  
(y-o-y, percent change)



Tepid growth in household take-home wage rates stems largely from an expected slowdown in trend labour productivity growth. Indeed, real wage growth is indexed on the evolution of long-run labour productivity, which will tumble from a growth rate of 1.2 per cent in 2008 to a growth rate of just 0.5 per cent after 2011. This lower expected rate of trend labour productivity growth reflects the historical long-run trend of the euro area's real GDP growth rate, as well as the current widely held view that the GFC will lead to a one-off decline in the level of labour productivity and a slight permanent decline in the growth rate of labour productivity (see Table 3, item 6). The GFC is expected to have a negative effect on human capital – knowledge and skills – through an increase in the structural unemployment rate. It could also weigh on the other determinants of total factor productivity by curtailing business expenditure on research and development, by reducing innovation and investment, by generating generally less buoyant “animal spirits” and by reducing entrepreneurial tolerance to risk-taking. Figure 1 shows how the global financial and

economic crisis led to a revision in the assumptions we make for trend hourly labour productivity, leading to a decline in the level of the euro area's potential real GDP to below what it was expected to have been previous to the GFC.

Household investment in residential buildings is also projected to decline significantly over the 2011-18 period. This decline comes on the back of a steady decline in population growth, and marks the return of investment levels back

towards what they were previous to their massive rise over 1990-07. As shown in Figure 5, the projected growth rates of gross residential investment should lead to a decline in the growth of the stock of residential buildings, which is expected to fall to about nil by 2018.

Business sector investment is projected to recover only very slowly from its precipitous decline of nearly 15 per cent in 2009. After a first small rise of 0.4 per cent in 2010, growth in business sector investment should remain very subdued, picking up only weakly and towards the end of the projection horizon as the euro area's output gap is closed and as rising output and depreciation push capacity utilisation rates back up to more normal levels. Hence, over the 2011-18 period, business gross fixed capital investment is projected to increase at an average rate of no more than 0.3 per cent per year.

With household income and consumption straining to progress over the 2011-18 period, with high unemployment rates and a rise in structural unemployment, and with private sector capacity utilisation rates still below normal levels over the first years of the projection period, pricing power and upward price pressure is projected to be mild in the euro area. After a 0.8 per cent yoy rise in 2010, consumer prices are projected to pursue a very gradual rise back towards the ECB's preferred range of inflation, slightly below the 2 per cent mark.

We already noted that euro area GDP growth over the 2011-18 period is projected to be underpinned by the area's real net exports, while domestic demand should recover only painstakingly slowly from the "Great Recession" of 2009. After plunging 14.8 per cent in 2009, export volumes are forecast to begin to recover in 2010, rising by 1.4 per cent on the year. Exports are then projected to increase significantly over the next two years, rebounding first from the low level to which they had fallen, and then rising moderately as the euro area's foreign effective demand increases.

Export growth is not projected to be underpinned by favourable exchange rate developments. Indeed, while the euro currency is projected to depreciate against the US dollar and the Japanese yen over the projection period, it should appreciate against other world currencies. This would then translate into a moderate nominal effective exchange rate appreciation over 2011-18.

**Figure 5**

**Residential Investment and the Housing Stock**  
(index, year 2000=100)

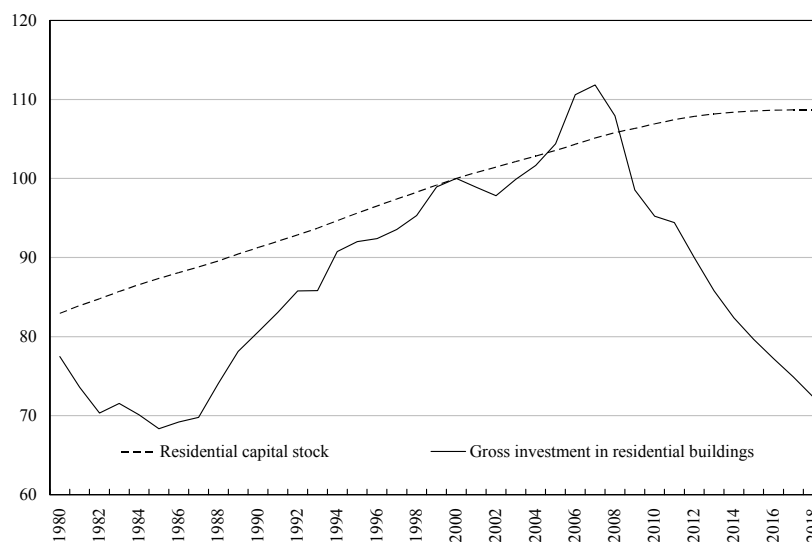


Table 4

## Baseline Projection Results for the Euro Area

Item	Average 1997- 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010- 2018
<b>I. Real aggregate demand and supply</b>												
1. Private consumption	2.0	-0.9	-0.0	-1.5	-0.8	-0.9	-0.7	-0.5	-0.4	-0.3	-0.4	-0.6
2. Government consumption	1.9	2.4	1.1	2.0	2.2	1.2	0.8	0.6	0.6	0.7	0.9	1.1
3. Gross fixed capital formation	3.2	-10.2	-0.7	0.1	-1.0	-1.1	-0.8	-0.5	-0.3	-0.1	-0.1	-0.5
- of which: residential buildings	1.8	-8.7	-3.4	-0.9	-4.7	-4.7	-3.9	-3.2	-2.8	-2.6	-2.8	-3.2
- of which: business sector	4.2	-14.7	0.4	0.3	0.2	-0.0	0.0	0.2	0.3	0.5	0.5	0.3
4. Exports	6.7	-14.8	1.4	8.4	8.2	6.4	5.4	5.0	4.8	4.9	5.0	5.5
5. Imports	6.8	-12.5	3.2	-0.9	-0.4	0.2	0.2	0.6	0.8	0.9	0.9	0.6
6. Gross Domestic Product	2.3	-3.9	0.5	1.4	1.6	0.9	0.8	0.9	0.9	1.0	1.1	1.0
7. Output gap ( <i>deviation of GDP from trend GDP, percent</i> )	0.5	-2.0	-2.1	-1.5	-0.6	-0.4	-0.4	-0.3	-0.2	-0.1	0.1	-0.6
8. Contributions to real GDP growth												
a) Total domestic expenditure	2.2	-3.3	0.8	-0.4	-0.2	-0.4	-0.4	-0.2	-0.1	-0.0	-0.0	-0.1
b) Net exports	0.1	-0.8	-0.3	1.8	1.8	1.4	1.2	1.1	1.0	1.0	1.1	1.1
<b>II. Deflators</b>												
1. Private consumption	1.7	0.0	0.8	0.6	0.7	1.0	1.1	1.2	1.2	1.4	1.5	1.1
2. Exports	0.6	0.3	0.2	-0.0	-0.2	-0.5	-0.7	-0.9	-1.1	-1.3	-1.5	-0.7
3. Imports	1.0	-5.1	2.8	-0.0	0.1	0.1	0.3	0.4	0.4	0.6	0.6	0.6
4. Gross domestic product	1.7	1.5	0.0	0.1	0.2	0.4	0.6	0.7	0.7	0.7	0.7	0.4
<b>III. Financial Markets</b>												
1. Short-term interest rate ( <i>level</i> )	3.4	1.2	1.2	1.1	1.3	1.6	1.8	2.0	2.2	2.5	3.0	1.9
2. Long-term interest rate ( <i>level</i> )	4.6	3.6	2.9	2.9	3.0	3.1	3.2	3.4	3.5	3.6	3.9	3.3
3. Spot exchange rate, euro/USD ( <i>level x 100</i> )	90.8	71.8	76.3	79.8	82.7	84.2	84.8	84.6	83.9	82.9	81.8	82.3
4. Spot exchange rate, euro/USD ( <i>+: depreciation</i> )	-0.3	5.6	6.3	4.5	3.8	1.8	0.7	-0.2	-0.9	-1.1	-1.4	1.5
5. Nominal effective exchange rate ( <i>+: depreciation</i> )	-3.4	-9.1	0.4	-0.8	-1.1	-2.3	-2.9	-3.6	-4.2	-4.2	-4.1	-2.5
6. Real effective exchange rate ( <i>+: depreciation</i> )	1.1	-5.8	2.1	1.2	1.3	0.4	0.2	-0.0	-0.2	0.1	0.6	0.6

Table 4 (continued)

## Baseline Projection Results for the Euro Area

Item	Average 1997- 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010- 2018
<b>IV. Labour Market</b>												
1. Labour supply	1.1	0.2	0.2	0.2	0.0	0.4	0.4	0.4	0.4	0.3	0.2	0.3
2. Employment, in hours	0.9	-3.5	-0.9	-0.9	0.6	1.0	1.0	0.8	0.5	0.2	-0.1	0.2
. of which private sector	0.9	-3.9	-1.2	-1.3	0.7	1.3	1.2	1.0	0.6	0.2	-0.2	0.3
3. Unemployment rate (percent of civilian labour force)	8.7	9.4	10.4	11.3	10.4	9.4	8.4	7.5	7.0	6.6	6.5	8.6
4. Nominal wage rate, private sector	2.7	0.9	1.6	1.0	0.4	0.5	0.9	1.2	1.4	1.6	1.6	1.1
5. Real take-home wage rate, private sector	0.9	2.9	0.9	0.1	-0.4	-0.5	-0.2	0.0	0.2	0.2	0.1	0.0
6. Real producer wage rate, private sector	1.2	-0.1	1.4	0.9	-0.3	0.1	0.3	0.6	0.8	0.9	1.0	0.6
7. Contemporaneous labour productivity, private sector	1.4	-0.6	1.5	2.3	1.0	-0.1	-0.1	0.1	0.4	0.8	1.2	0.8
<b>V. Household sector</b>												
1. Total real means	3.4	2.8	0.3	-0.7	-0.5	-0.7	-0.5	-0.4	-0.3	-0.3	-0.4	-0.4
- of which: real disposable income	1.8	-0.8	-0.1	-1.7	-1.0	-0.9	-0.7	-0.5	-0.4	-0.4	-0.5	-0.7
2. Net saving by households (percent of disposable income)	9.6	9.3	9.7	9.5	9.3	9.2	9.2	9.2	9.2	9.2	9.1	9.3
<b>VI. Fiscal sector</b>												
1. Net lending (+) or borrowing (-) (percent of GDP)	-2.0	-6.1	-7.2	-7.3	-7.3	-7.1	-7.0	-6.9	-6.9	-7.0	-7.2	-7.1
2. General government gross debt (percent of GDP)	69.9	78.4	85.2	91.3	96.9	102.7	108.2	113.5	118.6	123.6	128.6	107.6
<b>VII. International environment</b>												
1. Foreign effective output	5.2	-8.4	3.4	4.9	4.7	4.0	4.0	4.1	4.2	4.2	4.1	4.2
2. Current account balance (percent of GDP)	0.5	-0.4	-0.8	1.2	3.1	4.4	5.5	6.3	7.0	7.5	8.1	4.7
<b>VIII. Miscellaneous</b>												
1. Real GDP per capita	1.8	-4.5	0.2	1.0	1.4	0.7	0.7	0.7	0.8	0.9	1.0	0.8
2. Total population	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2

All figures are year-on-year growth rates of yearly averages, unless otherwise specified.

Real variables are in chained (2000) euro; price indexes are also chain-type measures.

The NIME bloc for the euro area represents the 12 Member States that composed the euro area up to 2007.

The real effective exchange rate of the euro area is defined here as the ratio of the euro area's foreign effective output price to its export price, measured in the euro area's own currency.

Table 5

## Main Results for the World Economy

Item	Average 1997- 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010- 2018
<b>I. World nominal GDP</b>												
1. Level (trillions of current euro)	<b>33.4</b>	39.5	41.5	44.0	46.2	48.0	49.6	51.0	52.2	53.7	55.1	<b>49.0</b>
- percent change, in euro	<b>5.0</b>	-3.0	5.2	5.9	5.1	4.0	3.3	2.8	2.4	2.7	2.7	<b>3.8</b>
2. Level (trillions of current USD)	<b>37.6</b>	55.0	54.4	55.1	55.9	57.1	58.7	60.7	62.9	65.5	68.4	<b>59.9</b>
- percent change, in USD	<b>5.7</b>	-8.1	-1.0	1.3	1.4	2.3	2.8	3.3	3.7	4.1	4.5	<b>2.5</b>
<b>II. World real GDP</b>												
1. Real GDP (euro)	<b>3.5</b>	-2.2	3.4	4.9	4.4	4.2	3.9	3.7	3.7	3.5	3.5	<b>3.9</b>
- per capita	<b>2.2</b>	-3.3	2.2	3.7	3.2	3.1	2.8	2.6	2.6	2.5	2.5	<b>2.8</b>
2. Real GDP (USD)	<b>4.6</b>	-7.4	-2.7	0.4	0.7	2.5	3.4	4.2	5.0	4.9	5.3	<b>2.6</b>
- per capita	<b>3.3</b>	-8.5	-3.8	-0.7	-0.4	1.4	2.3	3.1	3.9	3.9	4.3	<b>1.5</b>
<b>III. World export volumes</b>												
1. percent change, in euro	<b>6.5</b>	-14.6	2.9	0.7	1.6	2.0	2.2	2.5	2.8	2.9	3.0	<b>2.3</b>
2. percent change, in USD	<b>6.5</b>	-19.2	-3.1	-3.6	-2.0	0.4	1.7	3.0	4.0	4.3	4.8	<b>1.1</b>
3. exports (percent of World GDP)	<b>18.4</b>	17.9	18.5	18.1	17.9	17.9	17.8	17.8	17.8	17.8	17.8	<b>17.9</b>
<b>IV. Price of world exports (percent change)</b>												
1. at euro exchange rates	<b>-6.6</b>	-4.2	5.4	2.7	2.7	1.5	0.9	0.2	-0.4	-0.1	-0.2	<b>1.4</b>
2. at USD exchange rates	<b>-5.7</b>	-9.3	-0.8	-1.7	-0.9	-0.1	0.4	0.7	0.8	1.3	1.5	<b>0.1</b>
<b>V. Price of oil (bbl, Brent crude)</b>												
1. level, in USD	<b>35.2</b>	61.6	82.5	79.2	76.1	73.3	70.9	68.5	66.1	64.4	62.7	<b>71.5</b>
2. level, in euro	<b>30.4</b>	44.3	63.0	63.2	62.9	61.7	59.9	57.6	54.9	52.7	50.5	<b>58.5</b>
3. percent change, in USD	<b>15.4</b>	-36.4	33.9	-4.0	-4.0	-3.6	-3.3	-3.3	-3.5	-2.6	-2.5	<b>0.8</b>
4. percent change, in euro	<b>15.4</b>	-32.9	42.3	0.3	-0.4	-2.0	-2.9	-3.8	-4.7	-3.9	-4.2	<b>2.3</b>
<b>VI. World population</b>												
1. in billions	<b>6.2</b>	6.8	6.8	6.9	7.0	7.1	7.2	7.2	7.3	7.4	7.5	<b>7.2</b>
2. percent change	<b>1.2</b>	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	<b>1.1</b>

All figures are year-on-year growth rates of yearly averages, unless otherwise specified.  
Real aggregates are in chained (2000) currency units; price indexes are also chain-type measures.

This overall nominal effective exchange rate appreciation would then impose downward price pressures on exports, so as to ensure a slight depreciation of the area's real effective exchange rate.

Finally, relatively stable public spending on goods and services, on investment, stable public sector employment and the unconstrained working of the area's automatic fiscal stabilisers, should all tend to underpin euro area domestic demand, but lead also to a continued build-up of public sector debt. The euro area's consolidated public deficit is projected to rise to 7.3 per cent of GDP in 2011 and 2012, and then to edge down to 6.9 per cent of GDP in 2016. However, as of 2017, deficits are projected to resume their upwards course once again, as fiscal positions are negatively impacted by the costs of ageing and as population growth grinds to a halt.

### *5.3 Main projection results for the world economy*

Table 5 provides basic aggregate results for the world economy. These results are produced by computing appropriately weighted averages of macroeconomic variables of the six fully-specified economic areas (the euro area, the United States, Japan, the Western non-euro EU MS, the Central and Eastern EU MS and the Rest of the World) of the model.



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# FISCAL POLICY MULTIPLIERS IN THE EU DURING THE CREDIT CRISIS: A DSGE ANALYSIS

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*This paper uses a multi region DSGE model with collateral constrained households and residential investment to examine the effectiveness of fiscal policy stimulus measures in a credit crisis. The paper explores alternative scenarios which differ by the type of budgetary measure, its length, the degree of monetary accommodation and the level of international coordination. It is found that an increase in households facing credit constraints and the fact that the zero lower bound on nominal interest rates has become binding both increase the effectiveness of temporary fiscal stimulus measures.*

## 1 Introduction

The depth of the global recession has led to a revival of interest in discretionary fiscal policy. The current recession has proved to be the deepest and longest since the 1930s and recovery remains uncertain and fragile. But the general policy response to the downturn has been swift and decisive. Aside from government interventions dealing with the liquidity and solvency problems of the financial sector, including unconventional measures in the form of quantitative easing, the European Economic Recovery Plan (EERP) was launched back in December 2008. The objective of the EERP was to restore confidence and bolster demand through a coordinated injection of purchasing power into the economy complemented by strategic investments and measures to shore up business and labour markets. Governments across the world have implemented large fiscal stimulus packages. In the European Union, the overall discretionary fiscal stimulus over 2009 and 2010 amounts to more than 2 per cent of GDP, and this is further enhanced by the workings of automatic stabilisers.

There exists widespread scepticism on the effectiveness of fiscal policy as a general instrument for stabilisation purposes, and it is frequently argued that it is best to let fiscal policy have its main countercyclical impact through the operation of automatic stabilisers. But with limited room for a stronger monetary policy response, the effectiveness of temporary fiscal measures in stabilising the economy needed reexamination. There are several reasons why a temporary fiscal stimulus can be more powerful in the current financial crisis. First, to the extent that this recession is purely demand driven, fiscal policy can be more effective than in previous recessions that were to a large extent caused by supply side factors (e.g., oil price shocks). When the economy is hit by supply shocks there is little active discretionary fiscal policy can do. A second factor that justified earlier scepticism on fiscal policy was the rapid financial liberalisation. When more and more households acquired access to financial markets and were able to smooth their consumption, fiscal policy became less powerful. The financial crisis has had a profound effect on credit conditions and led to a sharp tightening in lending practices. With the sharp increase in the share of credit constrained households, fiscal policy has become more effective. Third, for those economies where interest rates are near their zero lower bound, monetary policy can be accommodative to the fiscal expansion and the resulting increase in inflation and decrease in real interest rates form an additional indirect channel through which growth can be supported. Fourth, as the financial crisis has long-lasting consequences and the recovery is expected to be

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fragile and feeble, the often argued disadvantage of fiscal policy that it is not timely due to long implementation lags, seems less relevant at the current juncture.

This paper examines the effectiveness of fiscal policy measures. In many of the euro area countries, fiscal multipliers are larger than under “normal” circumstances due to the presence of credit constrained households and nominal interest rates at the zero lower bound. This not necessarily holds in the Member States in Central and Eastern Europe. One particular aspect in which these economies differ from the old member states is that a larger share of household debt is denominated in foreign currencies (like, e.g., in Latvia and Hungary). This can have a profound effect on household spending when the domestic currency depreciates *vis-à-vis* the currency in which debt is denominated. A second aspect in which many of these countries differ from the old EU15 is that monetary policy had less space to be accommodative.

We use a modern dynamic stochastic general equilibrium (DGSE) model in which collateral constraints play an important role. The main transmission channels of the financial crisis into the real economy are thought to be through higher risk premia and credit rationing for households and firms. By disaggregating households into credit constrained and a non-constrained group, along the lines suggested by the recent literature on collateral constraints,<sup>1</sup> we can examine the importance of tighter credit constraints on the effectiveness of discretionary fiscal policy. The presence of credit constrained households raises the marginal propensity to consume out of current net income and makes fiscal policy a more powerful tool for short run stabilisation. A second reason why fiscal policy can be more powerful with deflationary shocks like the current financial crisis is that credit constrained consumers react even more strongly to a fall in real interest rates, which as argued above can occur when monetary policy can be accommodative towards the fiscal stimulus, and allow real interest rates to fall.

The rest of the paper is structured as follows. The next section starts with a brief overview of the fiscal measures that have been undertaken by the governments in the European Union. This is followed by a brief description of the QUEST III model, with particular emphasis on the household sector and collateral constrained households. The next section gives a review of the size of fiscal multipliers in this model for a range of fiscal instruments and under alternative assumptions. The following section then presents simulation results of a credit crisis and shows how a temporary fiscal stimulus can mitigate the output losses associated with the crisis.

## 2 Fiscal stimulus packages in the New Member States of the EU

The EU has combined structural reforms with active fiscal stimulus to address the economic downturn. Large fiscal stimulus packages have been implemented across the EU in 2009 and 2010.<sup>2</sup> The packages have broadly followed desirable general principles, *i.e.*, they were differentiated according to the available fiscal room for manoeuvre and relied on measures that were targeted, timely and temporary. Tables 1 and 2 give an overview of the fiscal stimulus measures implemented in the EU Member States, using a classification of measures in four broad categories: measures aimed at supporting household purchasing power, labour market measures, measures aimed at companies, and measures aimed at increasing/bringing forward investment. The dispersion of package sizes is considerable. On average in the EU, the fiscal stimulus in 2009 amounted to more than 1 percent of GDP and slightly less than that in 2010, with generally a strong emphasis on measures supporting household income. Many of the countries most affected by the

<sup>1</sup> See, e.g., Kiyotaki and Moore (1997), Iacoviello (2005), Iacoviello and Neri (2008), Monacelli (2007), Calza, Monacelli and Stracca (2007), Darracq Pariès and Notarpietro (2008).

<sup>2</sup> The European Economic Recovery Programme (EERP) is estimated to total around 2 per cent of GDP over 2009-10, including EUR 20 billion (0.3 per cent of EU GDP) through loans funded by the European Investment Bank.

Table 1

**Fiscal Stimulus Measures in EU Member States: 2009 and 2010**  
**2009**

<b>Country</b>	<b>Total Stimulus Measures</b>  <i>(percent of GDP)</i>	<b>A Supporting Household Purchasing Power</b>  <i>(percent of GDP)</i>	<b>B Labour Market Measures</b>  <i>(percent of GDP)</i>	<b>C Measures Aimed at Companies</b>  <i>(percent of GDP)</i>	<b>D Increasing/ Bringing Forward Investment</b>  <i>(percent of GDP)</i>
BE	0.94	0.38	0.03	0.20	0.00
BG	0.00	0.00	0.00	0.00	0.00
CZ	1.99	0.65	0.56	0.68	0.10
DK	−0.08	0.00	0.00	−0.08	0.00
DE	1.71	0.62	0.22	0.46	0.41
EE	0.00	0.00	0.00	0.00	0.00
IE	0.54	0.40	0.00	0.14	0.00
EL	0.19	0.12	0.05	0.01	0.00
ES	0.79	0.33	0.11	0.35	0.00
FR	0.65	0.14	0.11	0.27	0.14
IT	0.57	0.20	0.16	0.21	−0.01
CY	1.22	0.89	0.04	0.29	0.01
LV	1.76	1.73	0.00	0.04	0.00
LT	0.05	0.00	0.05	0.00	0.00
LU	1.90	1.50	0.34	0.06	0.00
HU	0.01	0.00	0.01	0.00	0.00
MT	0.56	0.00	0.00	0.48	0.09
NL	0.88	0.00	0.11	0.27	0.16
AT	1.39	1.09	0.23	0.02	0.04
PL	0.92	0.01	0.75	0.16	0.00
PT	0.29	0.00	0.16	0.09	0.03
RO	1.81	0.16	0.02	1.63	0.00
SI	0.86	0.04	0.18	0.30	0.34
SK	0.34	0.23	0.05	0.05	0.02
FI	1.29	1.04	0.02	0.23	0.00
SE	0.73	0.17	0.56	0.00	0.00
UK	1.72	1.35	0.07	0.28	0.02
EU27	1.06	0.46	0.16	0.29	0.12
EUR16	0.98	0.36	0.14	0.29	0.15

Table 1 (continued)

**Fiscal Stimulus Measures in EU Member States: 2009 and 2010**  
**2010**

<b>Country</b>	<b>Total Stimulus Measures</b>  <i>(percent of GDP)</i>	<b>A Supporting Household Purchasing Power</b>  <i>(percent of GDP)</i>	<b>B Labour Market Measures</b>  <i>(percent of GDP)</i>	<b>C Measures Aimed at Companies</b>  <i>(percent of GDP)</i>	<b>D Increasing/ Bringing Forward Investment</b>  <i>(percent of GDP)</i>
BE	0.75	0.42	0.03	0.00	0.00
BG	0.00	0.00	0.00	0.00	0.00
CZ	1.37	0.74	0.00	0.57	0.00
DK	0.11	0.00	0.00	0.11	0.00
DE	2.42	1.30	0.23	0.35	0.54
EE	0.00	0.00	0.00	0.00	0.00
IE	0.68	0.45	0.00	0.24	0.00
EL	0.00	0.00	0.00	0.00	0.00
ES	0.59	0.00	0.03	0.08	0.48
FR	0.25	0.01	0.00	0.17	0.07
IT	0.49	0.00	0.22	0.15	0.12
CY	0.98	0.67	0.01	0.29	0.02
LV	0.30	0.26	0.00	0.05	0.00
LT	0.01	0.00	0.01	0.00	0.00
LU	1.65	1.44	0.00	0.22	0.00
HU	0.02	0.00	0.02	0.00	0.00
MT	1.23	0.00	0.14	0.84	0.26
NL	0.83	0.00	0.10	0.20	0.17
AT	1.61	1.33	0.23	0.04	0.00
PL	0.81	0.02	0.70	0.09	0.00
PT	0.12	0.00	0.00	0.12	0.00
RO	0.00	0.00	0.00	0.00	0.00
SI	0.47	0.00	0.37	0.10	0.00
SK	0.45	0.32	0.06	0.06	0.00
FI	2.06	1.51	0.02	0.52	0.00
SE	1.32	0.73	0.59	0.00	0.00
UK	0.61	0.39	0.16	0.04	0.01
EU27	0.95	0.42	0.15	0.17	0.19
EUR16	1.05	0.45	0.12	0.20	0.25



crisis, particularly among the new Member States, have had very limited room to implement stimulus measures (and have often predominantly adopted consolidation measures with a view to avoiding a further fall-out from the crisis).

### 3 The model

The model used in this exercise is an extended version of the QUEST III model (Ratto *et al.*, 2009) with collateral constrained households and residential investment (see Röger and in 't Veld, 2009).<sup>3</sup> We use a 6 region version of this model, calibrated for the euro area, the New Member States not part of the euro area, the old member states outside the euro area, the US, emerging Asia, and the rest of the world.

There are three production sectors in each region, namely a sector producing tradables, non tradables and houses. We distinguish between Ricardian households which have full access to financial markets, credit constrained households facing a collateral constraint on their borrowing and liquidity constrained households which do not engage in financial markets. And there is a monetary and fiscal authority, both following rules based stabilisation policies. Behavioural and technological relationships can be subject to autocorrelated shocks denoted by  $U_t^k$ , where  $k$  stands for the type of shock. The logarithm of  $U_t^k$ <sup>4</sup> will generally be autocorrelated with autocorrelation coefficient  $\rho^k$  and innovation  $\varepsilon_t^k$ .

#### 3.1 Firms

There is a tradable and a non tradable sector, and there is a housing sector.

##### 3.1.1 Producers of tradables and non tradables

Firms operating in the tradable and non tradable sector are indexed by  $T$  and  $NT$  respectively  $j=(T,NT)$ . Each firm produces a variety of the domestic good which is an imperfect substitute for varieties produced by other firms. Because of imperfect substitutability, firms are monopolistically competitive in the goods market and face a demand function for goods. Domestic firms in the tradable sector sell consumption goods and services to private domestic and foreign households and the domestic and foreign government and they sell investment and intermediate goods to other domestic and foreign firms. The non tradable sector sells consumption goods and services only to domestic households and the domestic government and they sell investment and intermediate goods only to domestic firms including the residential construction sector. Preferences for varieties of tradables and non tradables can differ resulting in different mark ups for the tradable and non tradable sector.

Output is produced with a CES production function nesting a Cobb Douglas technology for value added using capital  $K_t^j$  and production workers  $L_t^j - LO_t^j$ , augmented with public capital

<sup>3</sup> See Röger, W. and J. in 't Veld (2009), "Fiscal Policy with Credit Constrained Households", *European Economy*, Economic Paper, No. 357, January, available at: [http://ec.europa.eu/economy\\_finance/publications/publication13839\\_en.pdf](http://ec.europa.eu/economy_finance/publications/publication13839_en.pdf)

<sup>4</sup> Lower cases denote logarithms, i.e.  $z_t = \log(Z_t)$ . Lower cases are also used for ratios and rates. In particular we define  $p_t^j = P_t^j / P_t^{GDP}$  as the relative price of good  $j$  w. r. t. the GDP deflator

$K_t^G$ , and a CES function for domestically produced ( $INTD$ ), imported ( $INTF$ ) and non-tradable intermediates  $INTNT$ .

$$O_t^j = \left\{ (1 - s_{\text{int}})^{\frac{1}{\sigma_{\text{in}}}} Y_t^j \left( \frac{\sigma_{\text{in}} - 1}{\sigma_{\text{in}}} \right) + s_{\text{int}}^{\frac{1}{\sigma_{\text{in}}}} INT_t^j \left( \frac{\sigma_{\text{in}} - 1}{\sigma_{\text{in}}} \right) \right\}^{\frac{\sigma_{\text{in}}}{\sigma_{\text{in}} - 1}} \quad (1)$$

where:

$$Y_t^j = (ucap_t^j K_t^j)^{1-\alpha} (L_t^j - LO_t^j)^\alpha U_t^{Y\alpha} (K_t^G)^{\alpha_G}, \quad \text{with } L_t^j = \left[ \int_0^1 L_t^{i,j \frac{\theta-1}{\theta}} di \right]^{\frac{\theta}{\theta-1}} \quad (2)$$

and:

$$INT_t^j = \left\{ s_T^{1/\sigma_{\text{nt}}} \left[ \left\{ s_{\text{dom}}^{\frac{1}{\sigma}} INTD \left( \frac{\sigma-1}{\sigma} \right) + (1 - s_{\text{dom}})^{\frac{1}{\sigma}} INTF \left( \frac{\sigma-1}{\sigma} \right) \right\}^{\left( \frac{\sigma}{\sigma-1} \right)} \right]^{\left( \frac{\sigma_{\text{nt}} - 1}{\sigma_{\text{nt}}} \right)} + \right. \\ \left. + (1 - s_T)^{1/\sigma_{\text{nt}}} INTNT \left( \frac{\sigma_{\text{nt}} - 1}{\sigma_{\text{nt}}} \right) \right\}^{\left( \frac{\sigma_{\text{nt}}}{\sigma_{\text{nt}} - 1} \right)} \quad (3)$$

The term  $LO_t^j$  represents overhead labour. Total employment of the firm  $L_t^j$  is itself a CES aggregate of labour supplied by individual households  $i$ . The parameter  $\theta > 1$  determines the degree of substitutability among different types of labour. Firms also decide about the degree of capacity utilisation ( $UCAP_t^j$ ). There is an economy wide technology shock  $U_t^Y$ . The objective of the firm is to maximise profits  $Pr$ :

$$Pr_t^j = p_t^j Y_t^j - w_t L_t^j - i_t^K p_t^K K_t^j - (adj^P(P_t^j) + adj^L(L_t^j) + adj^{UCAP}(ucap_t^j)) \quad (4)$$

where  $i^K$  denotes the rental rate of capital. Firms also face technological and regulatory constraints which restrict their price setting, employment and capacity utilisation decisions. Price setting rigidities can be the result of the internal organisation of the firm or specific customer-firm relationships associated with certain market structures. Costs of adjusting labour have a strong job specific component (e.g., training costs) but higher employment adjustment costs may also arise in heavily regulated labour markets with search frictions. Costs associated with the utilisation of capital can result from higher maintenance costs associated with a more intensive use of a piece of capital equipment. The following convex functional forms are chosen:

$$\begin{aligned}
adj^L(L_t^j) &= w_t(L_t^j u_t^L + \frac{\gamma_L}{2} \Delta L_t^j{}^2) \\
adj^P(P_t^j) &= \frac{\gamma_P}{2} \frac{(P_t^j - P_{t-1}^j)^2}{P_{t-1}^j} \\
adj^{UCAP}(ucap_t^j) &= PI_t K_t (\gamma_{ucap,1} (ucap_t^j - 1) + \frac{\gamma_{ucap,2}}{2} (ucap_t^j - 1)^2)
\end{aligned} \tag{5}$$

The firm determines labour input, capital services and prices optimally in each period given the technological and administrative constraints as well as demand conditions. The first order conditions are given by:

$$\frac{\partial Pr_t^j}{\partial L_t^j} \Rightarrow \left( \frac{\partial O_t^j}{\partial L_t^j} \eta_t^j - w_t u_t^L - w_t \gamma_L \Delta L_t^j + E_t(w_{t+1} \frac{\gamma_L}{(1+r_t)} \Delta L_{t+1}^j) \right) = w_t \tag{6a}$$

$$\frac{\partial Pr_t^j}{\partial K_t^j} \Rightarrow \left( \frac{\partial O_t^j}{\partial K_t^j} \eta_t^j \right) = i_t^K p_t^{K,j} \tag{6b}$$

$$\frac{\partial Pr_t^j}{\partial ucap_t^j} \Rightarrow \left( \frac{\partial O_t^j}{\partial ucap_t^j} \eta_t^j \right) = \frac{P_t^{K,j}}{P_t^j} K_t^j (\gamma_{ucap,1} + \gamma_{ucap,2} (ucap_t^j - 1)) \tag{6c}$$

$$\frac{\partial Pr_t^j}{\partial O_t^j} \Rightarrow \eta_t^j = 1 - 1/\sigma^d - \gamma_P \left[ \frac{1}{(1+r_t)} E_t \pi_{t+1}^j - \pi_t^j \right] \quad \text{with} \quad \pi_t^j = P_t^j / P_{t-1}^j - 1 \tag{6d}$$

Where  $\eta_t$  is the Lagrange multiplier of the technological constraint and  $r_t$  is the real interest rate. Firms equate the marginal product of labour, net of marginal adjustment costs, to wage costs. As can be seen from the left hand side of equation (6a), the convex part of the adjustment cost function penalises in cost terms accelerations and decelerations of changes in employment. Equations (6b-c) jointly determine the optimal capital stock and capacity utilisation by equating the marginal value product of capital to the rental price and the marginal product of capital services to the marginal cost of increasing capacity. Equation (6d) defines the mark up factor as a function of the elasticity of substitution and changes in inflation. The average mark up is equal to the inverse of the price elasticity of demand. We follow the empirical literature and allow for additional backward looking elements by assuming that a fraction ( $1-sfp$ ) of firms index price increases to inflation in  $t-1$ . Finally we also allow for a mark up shock. This leads to the following specification:

$$\eta_t^j = 1 - 1/\sigma^d - \gamma_P [\beta(sfp E_t \pi_{t+1}^j + (1-sfp) \pi_{t-1}^j) - \pi_t^j] - u_t^\eta \quad 0 \leq sfp \leq 1 \tag{6d'}$$

### 3.1.2 Residential construction

Firms  $h$  in the residential construction sector use new land ( $J_t^{Land}$ ) sold by (Ricardian) households and non tradable goods ( $J_t^{inp,H}$ ) to produce new houses using a CES technology:

$$J_t^H = \left( s_L^{\frac{1}{\sigma_L}} J_t^{Land \frac{(\sigma_L-1)}{\sigma_L}} + (1-s_L)^{\frac{1}{\sigma_L}} J_t^{inp,H \frac{(\sigma_L-1)}{\sigma_L}} \right) \tag{7}$$

Firms in the residential construction sector are monopolistically competitive and face price adjustment costs. Thus the mark up is given by:

$$\eta_t^H = 1 - 1/\sigma^H - \gamma_H [\beta(sfp E_t \pi_{t+1}^H + (1 - sfp)\pi_{t-1}^H) - \pi_t^H] - u_t^H \quad 0 \leq sfp \leq 1 \quad (8)$$

New and existing houses are perfect substitutes. Thus households can make capital gains or suffer capital losses depending on house price fluctuations.

### 3.2 Households

The household sector consists of a continuum of households  $h \in [0,1]$ . There are  $s^l \leq 1$  households which are liquidity constrained and indexed by  $l$ . These households do not trade on asset markets and consume their disposable income each period. A fraction  $s^r$  of all households are Ricardian and indexed by  $r$  and  $s^c$  households are credit constrained and indexed by  $c$ . The period utility function is identical for each household type and separable in consumption ( $C_t^h$ ), leisure ( $1 - L_t^h$ ) and housing services ( $H_t^h$ ). We also allow for habit persistence in consumption and leisure. Thus temporal utility for consumption is given by:

$$U(C_t^h, 1 - L_t^h, H_t^h) = \log(C_t^h - hC_{t-1}^h) + \vartheta(1 - L_t^h)^{1-\kappa} + \omega \log(H_t^h) \quad (9)$$

All three types of households supply differentiated labour services to unions which maximise a joint utility function for each type of labour  $i$ . It is assumed that types of labour are distributed equally over the three household types. Nominal rigidity in wage setting is introduced by assuming that the household faces adjustment costs for changing wages. These adjustment costs are borne by the household.

#### 3.2.1 Ricardian households

Ricardian households have full access to financial markets. They hold domestic government bonds ( $B_t^{G^r}$ ) and bonds issued by other domestic and foreign households ( $B_t^r, B_t^{F,r}$ ), real capitals ( $K_t^j$ ) of the tradable and non tradable sector as well as the stock of land ( $Land_t$ ) which is still available for building new houses and cash balances ( $M_t^r$ ). The household receives income from labour, financial assets, rental income from lending capital to firms, selling land to the residential construction sector plus profit income from firms owned by the household (tradables, non tradables, residential construction). We assume that all domestic firms are owned by Ricardian households. Income from labour is taxed at rate  $t^w$ , rental income at rate  $t^k$  and investors can receive an investment subsidy ( $itc_t$ ). In addition households pay lump-sum taxes  $T^{LS}$ . We assume that income from financial wealth is subject to different types of risk. Domestic bonds yield risk-free nominal return equal to  $i_t$ . Domestic and foreign bonds are subject to (stochastic) risk premia linked to net foreign indebtedness. Current spending is allocated to consumption ( $C_t^r$ ), investment in equipment and structures ( $I_t^j$ ) as well as residential investment ( $I_t^{H,r}, I_t^{HLC,r}$ ). An equity premium on real assets arises because of uncertainty about the future value of real assets. The Lagrangian of this maximisation problem is given by:

$$\begin{aligned}
\text{Max } V_0^r = & E_0 \sum_{t=0}^{\infty} \beta^t U(C_t^r, 1 - L_t^r, H_t^r) \\
& - E_0 \sum_{t=0}^{\infty} \lambda_t \beta^t \left( \begin{aligned} & (1+t_t^c) p_t^C C_t^r + \sum_j p_t^{K,j} (1-it_t^j) I_t^j + p_t^H (1+t_t^c) I_t^{H,r} + p_t^H (1+t_t^c) I_t^{HLC,r} + (B_t^{G,r} + B_t^r) \\ & + \text{rer}_t B_t^{F,r} - (1+r_{t-1})(B_{t-1}^{G,r} + B_{t-1}^r) - (1+r_{t-1}^F)(1-\text{risk}(.)) \text{rer}_t B_{t-1}^{F,r} \\ & - \sum_j ((1-t_t^k) i_{t-1}^{K,j} + t_t \delta^{K,j}) p_{t-1}^{K,j} K_{t-1}^j - (1-t_t^W) w_t L_t^r + \frac{\gamma_W}{2} \frac{\Delta W_t^2}{W_{t-1}} - \\ & ((1-t_t^k) i_{t-1}^H + \delta^H) p_t^H H_{t-1}^{LC,r} - p_t^L J_t^{Land} - \sum_{j=1} \text{Pr}_t^j - \text{Pr}_t^H + T_t^{LS,r} \end{aligned} \right) \\
& - E_0 \sum_{t=0}^{\infty} \lambda_t \beta^t \left( \sum_j \xi_t^j (K_t^j - J_t^j - (1-\delta^{K,j}) K_{t-1}^j) \right) \\
& - E_0 \sum_{t=0}^{\infty} \lambda_t \xi_t^r \beta^t (H_t^r - J_t^{H,r} - (1-\delta^H) H_{t-1}^{H,r}) \\
& - E_0 \sum_{t=0}^{\infty} \lambda_t \vartheta_t \beta^t (H_t^{LC,r} - J_t^{HLC,r} - (1-\delta^H) H_{t-1}^{LC,r}) \\
& - E_0 \sum_{t=0}^{\infty} \lambda_t \xi_t^r \beta^t (Land_t + J_t^{Land} - (1+g_t^L) Land_{t-1})
\end{aligned} \tag{10}$$

The investment decisions w.r.t. physical capital and housing are subject to convex adjustment costs, therefore we make a distinction between real investment expenditure ( $I_t^j, I_t^H$ ) and physical investment ( $J_t^j, J_t^H$ ). Investment expenditure of households including adjustment costs is given by:

$$I_t^j = J_t^j \left( 1 + \frac{(\gamma_K^j + u_t^j)}{2} \left( \frac{J_t^j}{K_t^j} \right) \right) + \frac{\gamma_I^j}{2} (\Delta J_t^j)^2 \tag{11a}$$

$$I_t^{H,r} = J_t^{H,r} \left( 1 + \frac{(\gamma_H + u_t^H)}{2} \left( \frac{J_t^{H,r}}{H_t^r} \right) \right) + \frac{\gamma_{IH}}{2} (\Delta J_t^{H,r})^2 \tag{11b}$$

The budget constraint is written in real terms with all prices expressed relative to the GDP deflator ( $P$ ). Investment is a composite of domestic and foreign goods. From the first order conditions we can derive the following consumption rule, where the ratio of the marginal utility of consumption in period  $t$  and  $t+1$  is equated to the real interest rate adjusted for the rate of time preference:

$$\frac{E_t(C_{t+1}^r - hC_t^r)}{C_t^r - hC_{t-1}^r} = \beta^r (1 + r_t) \tag{12}$$

From the arbitrage condition of investment we can derive an investment rule which links capital formation to the shadow price of capital.

$$\left( (\gamma_K^j + u_t^j) \left( \frac{J_t^{K,j}}{K_{t-1}^j} \right) + \gamma_t^j \Delta J_t^{K,j} \right) - E_t \left( \frac{1}{(1+r+\pi_{t+1}^{GDP} - \pi_{t+1}^{K,j})} \Delta J_{t+1}^{K,i} \right) = \frac{\xi_t^j}{p_t^K (1-itc_t)} - 1 \quad (13)$$

where the shadow price of capital is given as the present discounted value of the rental income from physical capital:

$$\frac{\xi_t^j}{p_t^{K,j}} = E_t \left( \frac{1}{(1+r_t + \pi_{t+1}^{GDP} - \pi_{t+1}^{K,j})} \frac{\xi_{t+1}^j}{p_{t+1}^{K,j}} (1-\delta^K) \right) + ((1-t_t^K) i_t^K + t_t^K \delta^{K,j}) = 0 \quad (14)$$

From the FOC for housing investment we can derive a housing investment rule, which links investment to the shadow price of housing capital:

$$\left( (\gamma_H + u_t^H) \left( \frac{J_t^{H,r}}{H_{t-1}^r} \right) + \gamma_t^H \Delta J_t^{H,r} \right) - E_t \left( \frac{1}{(1+r_t + \pi_{t+1}^{GDP} - \pi_{t+1}^H - \Delta t_{t+1}^c)} \Delta J_{t+1}^{H,r} \right) = \frac{\xi_t^r}{p_t^H (1+t_t^c)} - 1 \quad (15)$$

The shadow price of housing capital can be represented as the present discounted value of the ratio of the marginal utility of housing services and consumption:

$$\frac{\xi_t^r}{p_t^H (1+t_t^c)} = \omega \frac{(C_t^r - h C_{t-1}^r)(1+t_t^c) p_t^c}{H_t^r (1+t_t^c) p_t^H} + E_t \left( \frac{1}{(1+r_t + \pi_{t+1}^{GDP} - \pi_{t+1}^H - \Delta t_{t+1}^c)} \frac{\xi_{t+1}^r}{p_{t+1}^H (1+t_{t+1}^c)} (1-\delta^H) \right) \quad (16)$$

For the price of land we one obtain a (quasi) Hotelling rule:

$$p_t^{Land} = E_t \left( \frac{1}{(1+r_t)} p_{t+1}^{Land} (1+g_L) \right) \quad (17)$$

The growth rate of the price of land must guarantee a rate of return which can be earned by other assets, *i.e.*, the growth rate of the price of land must be equal to  $r_t - g_L$ .

### 3.2.2 Credit constrained households

Credit constrained households differ from Ricardian households in two respects. First they have a higher rate of time preference ( $\beta^c < \beta^r$ ) and they face a collateral constraint on their borrowing. They borrow  $B_t^c$  exclusively from domestic Ricardian households. Ricardian households have the possibility to refinance themselves via the international capital market. The Lagrangian of this maximisation problem is given by:

$$\begin{aligned} \text{Max } V_0^c = & E_0 \sum_{t=0}^{\infty} \beta^{c^t} U(C_t^c, 1-L_t^c, H_t^c) \\ & - E_0 \sum_{t=0}^{\infty} \lambda_t^c \beta^{c^t} \left( (1+t_t^c) p_t^c C_t^c + p_t^H (1+t_t^H) I_t^{H,c} - B_t^c + (1+r_{t-1}) B_{t-1}^c - (1-t_t^W) w_t L_t^c + \frac{\gamma_W}{2} \frac{\Delta W_t^2}{W_{t-1}} + T_t^{LS,c} \right) \\ & - E_0 \sum_{t=0}^{\infty} \lambda_t^c \zeta_t^c \beta^{c^t} (H_t^c - J_t^{H,c} - (1-\delta^H) H_{t-1}^c) \\ & - E_0 \sum_{t=0}^{\infty} \lambda_t^c \psi_t^c \beta^{c^t} (B_t^c - (1-\chi) p_t^H H_t^c) \end{aligned} \quad (18)$$

From the first order conditions we can derive the following decision rules for consumption:

$$\frac{E_t(C_{t+1}^c - hC_t^c)}{C_t^c - hC_{t-1}^c} = \beta^c \frac{(1+r_t)}{(1-\psi_t)} \quad (19)$$

and housing investment:

$$\left( (\gamma_H + u_t^H) \left( \frac{J_t^{H,c}}{H_{t-1}^c} \right) + \gamma_{tH} \Delta J_t^{H,c} \right) - E_t \left( \frac{(1-\psi_t)}{(1+r_t + \pi_{t+1}^{GDP} - \pi_{t+1}^H - \Delta t_{t+1}^c)} \Delta J_{t+1}^{H,c} \right) = \frac{\zeta_t^c}{p_t^H (1+t_t^c)} - 1 \quad (20)$$

where, again, the shadow price of housing capital is the present discounted value of the ratio of the marginal utility of housing services and consumption:

$$\frac{\zeta_t^c}{p_t^H (1+t_t^c)} = \omega^c \frac{(C_t^c - hC_{t-1}^c)(1+t_t^c)p_t^c}{H_t^c (1+t_t^c)p_t^H} + \psi_t(1-\chi) + E_t \left( \frac{(1-\psi_t)}{(1+r_t + \pi_{t+1}^{GDP} - \pi_{t+1}^H - \Delta t_{t+1}^c)} \frac{\zeta_{t+1}^c}{p_{t+1}^H (1+t_{t+1}^c)} (1-\delta^H) \right) \quad (21)$$

The major difference between credit constrained and Ricardian households is the presence of the Lagrange multiplier of the collateral constraint in both the consumption and the investment rule of the former. The term  $\psi_t$  acts like premium on the interest rate which fluctuates positively with the tightness of the constraint.

One specific feature in many of the Member States in Central and Eastern Europe is that many households are indebted in foreign currency. For example, it is estimated that in Latvia more than 90 per cent of mortgage debt is denominated in euros, while in Hungary household debt is predominantly in Swiss francs. Poland and Romania have similarly high shares of foreign currency denominated debt. To capture this feature we include an alternative specification of the budget constraint:

$$e_t B_t^c - (1+r_{t-1}^*)e_t B_{t-1}^c + (1-t_t^w)w_t L_t^c + TR_t^{LS,c} = (1+t_t^c)p_t^c C_t^c + p_t^H (1+t_t^H)I_t^{H,c} \quad (18')$$

where  $B_t^c$  is now denominated in the foreign currency and  $e$  is the exchange rate (domestic currency per unit of foreign currency) and a star indicates foreign variables. The collateral constraint in this case takes the following form

$$e_t B_t^c = (1-\chi)p_t^H H_t^c \quad (18'')$$

### 3.2.3 Liquidity constrained households

Liquidity constrained households do not optimize but simply consume their entire labour income at each date. Real consumption of household  $k$  is thus determined by net wage income plus transfers minus a lump-sum tax:

$$(1+t_t^c)P_t^c C_t^l = (1-t_t^w)W_t L_t^l + TR_t^l - T_t^{LS,l} \quad (22)$$

It is assumed that liquidity constrained households possess the same utility function as Ricardian households.

### 3.2.4 Wage setting

A trade union is maximising a joint utility function for each type of labour  $i$  where it is

assumed that types of labour are distributed equally over constrained and unconstrained households with their respective population weights. The trade union sets wages by maximising a weighted average of the utility functions of these households. The wage rule is obtained by equating a weighted average of the marginal utility of leisure to a weighted average of the marginal utility of consumption times the real wage, adjusted for a wage mark up:

$$\frac{s^c U_{1-L,t}^c + s^r U_{1-L,t}^r + s^l U_{1-L,t}^l}{s^c U_{c,t}^c + s^r U_{c,t}^r + s^l U_{c,t}^l} = \frac{(1-t_t^w) W_t}{(1+t_t^c) P_t^c} \eta_t^w \quad (23)$$

where  $\eta_t^w$  is the wage mark up factor, with wage mark ups fluctuating around  $1/\theta$  which is the inverse of the elasticity of substitution between different varieties of labour services. The trade union sets the consumption wage as a mark up over the reservation wage. The reservation wage is the ratio of the marginal utility of leisure to the marginal utility of consumption. This is a natural measure of the reservation wage. If this ratio is equal to the consumption wage, the household is indifferent between supplying an additional unit of labour and spending the additional income on consumption and not increasing labour supply. Fluctuation in the wage mark up arises because of wage adjustment costs and the fact that a fraction  $(1-sfw)$  of workers is indexing the growth rate of wages  $\pi_t^w$  to inflation in the previous period:

$$\eta_t^w = 1 - 1/\theta - \gamma_w / \theta [\beta(\pi_{t+1}^w - (1-sfw)\pi_t) - (\pi_t^w - (1-sfw)\pi_{t-1})] \quad 0 \leq sfw \leq 1 \quad (24)$$

Combining (23) and (24) one can show that the (semi) elasticity of wage inflation with respect to the employment rate is given by  $(\kappa/\gamma_w)$ , *i.e.*, it is positively related to the inverse of the labour supply elasticity and inversely related to wage adjustment costs.

### 3.2.5 Aggregation

The aggregate of any household specific variable  $X_t^h$  in per capita terms is given by  $X_t = \int_0^1 X_t^h dh = s^r X_t^r + s^c X_t^c + s^l X_t^l$  since households within each group are identical. Hence aggregate consumption is given by:

$$C_t = s^r C_t^r + s^c C_t^c + s^l C_t^l \quad (25a)$$

and aggregate employment is given by:

$$L_t = s^r L_t^r + s^c L_t^c + s^l L_t^l \quad \text{with } L_t^r = L_t^c = L_t^l \quad (25b)$$

Since liquidity constrained households do not own financial assets we have  $B_t^l = B_t^{l^F} = K_t^l = 0$ . Credit constrained households only engage in debt contracts with Ricardian households, therefore we have:

$$B_t^c = \frac{s^r}{s^c} B_t^r \quad (26)$$

### 3.3 Trade and the current account

So far we have only determined aggregate consumption, investment and government purchases but not the allocation of expenditure over domestic and foreign goods. In order to



facilitate aggregation we assume that households, the government and the corporate sector have identical preferences across goods used for private consumption, public expenditure and investment. Let  $Z^i \in \{C^i, I^i, C^{G,i}, I^{G,i}\}$  be demand of an individual household, investor or the government, and then their preferences are given by the following utility function:

$$Z^i = \left[ (1 - s^M - u_t^M)^{\frac{1}{\sigma^M}} Z^{d^i \frac{\sigma^M - 1}{\sigma^M}} + (s^M + u_t^M)^{\frac{1}{\sigma^M}} Z^{f^i \frac{\sigma^M - 1}{\sigma^M}} \right]^{\frac{\sigma^M}{(\sigma^M - 1)}} \quad (27a)$$

where the share parameter  $s^M$  can be subject to random shocks and  $Z^{d^i}$  and  $Z^{f^i}$  are indexes of demand across the continuum of differentiated goods produced respectively in the domestic economy and abroad, given by:

$$Z^{d^i} = \left[ \sum_{h=1}^n \left( \frac{1}{n} \right)^{\frac{1}{\sigma^d}} Z_h^{d^i \frac{\sigma^d - 1}{\sigma^d}} \right]^{\frac{\sigma^d}{\sigma^d - 1}}, \quad Z^{f^i} = \left[ \sum_{h=1}^m \left( \frac{1}{m} \right)^{\frac{1}{\sigma^f}} Z_h^{f^i \frac{\sigma^f - 1}{\sigma^f}} \right]^{\frac{\sigma^f}{\sigma^f - 1}} \quad (27b)$$

The elasticity of substitution between bundles of domestic and foreign goods  $Z^{d^i}$  and  $Z^{f^i}$  is  $\sigma^M$ . Thus aggregate imports are given by:

$$M_t = (s^M + u_t^M) \left[ \rho^{PCPM} \frac{P_{t-1}^C}{P_t^M} + (1 - \rho^{PCPM}) \frac{P_t^C}{P_t^M} \right]^{\sigma^M} (C_t + I_t^{inp} + C_t^G + I_t^G) \quad (28)$$

where  $P^C$  and  $P^M$  is the (utility based) consumer price deflator and the lag structure captures delivery lags. We assume similar demand behaviour in the rest of the world, therefore exports can be treated symmetrically and are given by:

$$X_t = (s^{M,W} + u_t^X) \left( \rho^{PWPX} \frac{P_{t-1}^{C,F} E_{t-1}}{P_t^X} + (1 - \rho^{PWPX}) \frac{P_t^{C,F} E_t}{P_t^X} \right)^{\sigma^X} Y_t^F \quad (29)$$

where  $P_t^X$ ,  $P_t^{C,F}$  and  $Y_t^F$  are the export deflator, an index of world consumer prices (in foreign currency) and world demand. Prices for exports and imports are set by domestic and foreign exporters respectively. The exporters in both regions buy goods from their respective domestic producers and sell them in foreign markets. They transform domestic goods into exportables using a linear technology. Exporters act as monopolistic competitors in export markets and charge a mark-up over domestic prices. Thus export prices are given by:

$$\eta_t^X P_t^X = P_t \quad (30)$$

and import prices are given by:

$$\eta_t^M P_t^M = E_t P_t^F \quad (31)$$

Mark-up fluctuations arise because of price adjustment costs. There is also some backward indexation of prices since a fraction of exporters ( $1 - s_{fpx}$ ) and ( $1 - s_{fpm}$ ) is indexing changes of prices to past inflation. The mark-ups for import and export prices are also subject to random shocks:

$$\eta_t^k = 1 - 1/\sigma^k - \gamma_{Pk} [\beta(sfp^k \cdot \pi_{t+1}^k + (1 - sfp^k)\pi_{t-1}^k) - \pi_t^k] + u_t^{P,k} \quad k = \{X, M\} \quad (32)$$

Exports and imports together with interest receipts/payments determine the evolution of net foreign assets denominated in domestic currency:

$$E_t B_t^F = (1 + i_t^F) E_t B_{t-1}^F + P_t^X X_t - P_t^M M_t \quad (33)$$

### 3.4 Policy

We assume that monetary policy is partly rules based and partly discretionary. Policy responds to an output gap indicator of the business cycle. The output gap is not calculated as the difference between actual and efficient output but we try to use a measure that closely approximates the standard practice of output gap calculation as used for fiscal surveillance and monetary policy (see Denis *et al.*, 2006). Often a production function framework is used where the output gap is defined as deviation of capital and labour utilisation from their long run trends. Therefore we define the output gap as:

$$YGAP_t = \left( \frac{ucap_t}{ucap_t^{ss}} \right)^{(1-\alpha)} \left( \frac{L_t}{L_t^{ss}} \right)^\alpha \quad (34)$$

where  $L_t^{ss}$  and  $ucap_t^{ss}$  are moving average steady state employment rate and capacity utilisation:

$$ucap_t^{ss} = (1 - \rho^{ucap}) ucap_{t-1}^{ss} + \rho^{ucap} ucap_t^j \quad (35)$$

$$L_t^{ss} = (1 - \rho^{Lss}) L_{t-1}^{ss} + \rho^{Lss} L_t \quad (36)$$

which we restrict to move slowly in response to actual values.

Monetary policy is modelled via the following Taylor rule, which allows for some smoothness of the interest rate response to the inflation and output gap:

$$i_t = \tau_{lag}^{INOM} i_{t-1} + (1 - \tau_{lag}^{INOM}) [r^{EQ} + \pi^T + \tau_{\pi}^{INOM} (\pi_t^C - \pi^T) + \tau_{y,1}^{INOM} ygap_{t-1}] + \tau_{y,2}^{INOM} (ygap_{t+1} - ygap_t) + u_t^{INOM} \quad (37)$$

The Central bank has a constant inflation target  $\pi^T$  and it adjusts interest rates whenever actual consumer price inflation deviates from the target. The central bank also responds to the output gap. There is also some inertia in nominal interest rate setting. There is no active fiscal policy.

In the government budget constraint, we distinguish on the expenditure side government consumption, government investment, transfer payments to households and investment subsidies. Revenue consists of taxes on consumption as well as capital and labour income, and lump-sum taxes. Government debt ( $B_t$ ) evolves according to:

$$B_t = (1 + i_t) B_{t-1} + P_t^C C_t^G + P_t^I I_t^G + TR_t + itc_t P_t^I I_t - t_t^w W_t L_t - t_t^c P_t^C C_t - t_t^K i_t^K P_t^I K_{t-1} - T_t^{LS} \quad (38)$$

The labour income tax rate is used for controlling the debt-to-GDP ratio according to the following rule:

$$\Delta t_t^w = \tau^B \left( \frac{B_{t-1}}{Y_{t-1} P_{t-1}} - b^T \right) + \tau^{DEF} \Delta \left( \frac{B_t}{Y_t P_t} \right) \quad (39)$$

where  $b^T$  is the government debt target.

#### 4 Model calibration

The model used in this exercise consists of six regions: the Euro area, the new member states not participating in the euro, the rest of the EU, the US, emerging Asia and the rest of the world. The regions are differentiated from one another by their economic size and the model is calibrated on bilateral trade flows. Although the calibration incorporates some of the main stylised differences between the regions, it relies heavily on estimates of this model on euro area and US data (see Ratto *et al.*, 2009a and 2009b). Table 2 summarises the main differences between the blocks, which are, for the EU countries, generally higher transfers and unemployment benefits, higher wage taxes, higher price rigidities and labour adjustment costs, and a lower elasticity of labour supply.

In terms of nominal and real rigidities, our estimates reveal differences which are largely consistent with prior expectations and other empirical evidence. This is most clear when it comes to price adjustment rigidities. European firms keep prices fixed for more quarters than US firms. However, our estimates suggest that the duration of wage spells in the US is similar to those in the EA. There are significant differences in the labour supply elasticity. A significantly higher elasticity in the US translates into a smaller response in US wages to changes in employment. Higher labour adjustment costs in the EU reflect higher employment protection in the EU. We assume similar capital adjustment costs in all regions. Concerning financial market frictions, we assume 30 percent of households to be liquidity-constrained, which corresponds closely to our estimates, and we keep this share unchanged. When we include collateral constrained households in the model we assume their share is 30 percent of households, and the remainder are all unconstrained “Ricardian” households (when for comparison in section 5 we exclude collateral constraints the share of Ricardian households is 70 percent). The loan-to-value ratio ( $1-\chi$ ) is set at 0.75 in all regions, calibrated to fit a mortgage debt ratio as share of GDP on the baseline of around 50 percent. Estimated Taylor rules do not point to sizeable differences in monetary policy behaviour and we set these parameters identical. Other important stylised difference between regions are the size and generosity of the transfer system.

#### 5 Fiscal instruments and their multipliers

There is no single fiscal multiplier but the size depends on a number of factors. Table 3 shows the fiscal multipliers of various fiscal instruments in 1) a model without collateral constraints, 2) in the model with collateral constrained households, and 3) in a model with collateral constrained households and with monetary accommodation. The multipliers reported in this table are for the EU as an aggregate region. Single country results will be somewhat smaller as the degree of openness of the economy also plays a significant role. In a small open economy more of the fiscal stimulus will leak abroad through higher imports. The duration is also important and the impact of a fiscal stimulus depends crucially on whether the shock is credibly temporary or perceived to be permanent. In the latter case, economic agents will anticipate higher tax liabilities and increase their savings, leading to stronger crowding out and smaller GDP effects. We only consider temporary fiscal stimulus here and focus on one year shocks of 1 per cent of baseline GDP.

In general, GDP effects are larger for public spending shocks (government consumption and

Table 2

## Model Calibration

Item	EA	NE	REU	US	AS	RW
<b>Nominal rigidities</b>						
Avg. duration between price adjustments ( <i>quarters</i> )	5.5	5.5	5.5	5	5	5
Avg. wage contract length ( <i>quarters</i> )	4.5	4.5	4.5	4.5	4.5	4.5
<b>Real rigidities</b>						
Labour adjustment cost ( <i>percent of total add. wage costs</i> ) ( $\gamma_L$ )	13	13	13	10	10	10
Labour supply elasticity ( $1/\kappa$ )	1/5	1/5	1/5	1/3	1/3	1/3
Semi-wage elasticity w.r.t. employment rate ( $\kappa/\gamma_w$ )	0.33	0.33	0.33	0.20	0.20	0.20
Capital adjustment cost ( $\gamma_K$ )	20	20	20	20	20	20
Investment adjustment cost ( $\gamma_I$ )	75	75	75	75	75	75
<b>Consumption</b>						
Share of liquidity-constrained consumers $s^l$	0.3	0.3	0.3	0.3	0.3	0.3
Share of credit-constrained consumers $s^c$	0.3	0.3	0.3	0.3	0.3	0.3
Share of non-constrained consumers $s^r$	0.4	0.4	0.4	0.4	0.4	0.4
Downpayment rate $\chi$	0.25	0.25	0.25	0.25	0.25	0.25
Habit persistence $h$	0.7	0.7	0.7	0.7	0.7	0.7
<b>Monetary policy</b>						
Lagged interest rate $\tau_{lag}^{INOM}$	0.82	0.82	0.82	0.82	0.82	0.82
Consumer price inflation $\tau_{\pi}^{INOM}$	1.5	1.5	1.5	1.5	1.5	1.5
Output gap $\tau_Y^{INOM}$	0.05	0.05	0.05	0.05	0.05	0.05
<b>National accounts</b>						
Consumption	0.59	0.59	0.59	0.64	0.64	0.64
Investment tradables	0.06	0.06	0.06	0.05	0.05	0.05
Investment non-tradables	0.07	0.07	0.07	0.06	0.06	0.06
Investment residential	0.06	0.06	0.06	0.06	0.06	0.06
Government consumption	0.18	0.18	0.18	0.15	0.15	0.15
Government investment	0.04	0.04	0.04	0.04	0.04	0.04
Exports	0.18	0.45	0.30	0.15	0.15	0.40
Imports	0.18	0.45	0.30	0.15	0.15	0.40
<b>Transfers to households</b>	0.16	0.16	0.16	0.13	0.13	0.13

investment) than for tax reductions and transfers to households. Increasing *investment subsidies* yields sizeable effects especially if it is temporary since it leads to a reallocation of investment spending into the period the purchase of new equipment and structures is subsidised. *Government investment* yields a somewhat larger GDP multiplier than *purchases of goods and services*. However, it is mainly the long run GDP multiplier which shows a significant difference because of the productivity enhancing effects of government investment. An increase in *government transfers* has a smaller multiplier, as it goes along with negative labour supply incentives. However, transfers targeted to liquidity constrained consumers provide a more powerful stimulus as these consumers have a larger marginal propensity to consume out of current net income.

Temporary reductions in *value added* and *labour taxes* show smaller multipliers, but in these cases it is nearly entirely generated by higher spending of the private sector. A temporary reduction in consumption taxes is more effective than a reduction in labour taxes as also forward looking households respond to this change in the intertemporal terms of trade.<sup>5</sup> A temporary reduction of taxes is attractive from a credibility point of view, since the private sector is likely to believe in a reversal of a temporary tax cut more than into a reversing of a temporary spending increase. Temporary *corporate tax* reduction would not yield positive short run GDP effects since firms calculate the tax burden from an investment project over its entire life cycle.

The presence of credit-constrained agents raises the multiplier as these agents have a larger marginal propensity to consume out of current net income. The multiplier increases especially for those fiscal measures which increase current income of households directly, such as labour taxes and transfers, while the increase is less strong for government consumption and investment. The reason for this is that credit constrained households not only have a higher marginal propensity to consume out of current income but their spending is also highly sensitive to changes in real interest rates (see Röger and in 't Veld, 2009). This is because the collateral constraint requires that spending must be adjusted to changes in interest payments. In other words, the interest rate exerts an income effect on spending of credit constrained households. For realistic magnitudes of indebtedness, the interest sensitivity exceeds the interest elasticity of spending of Ricardian households substantially.

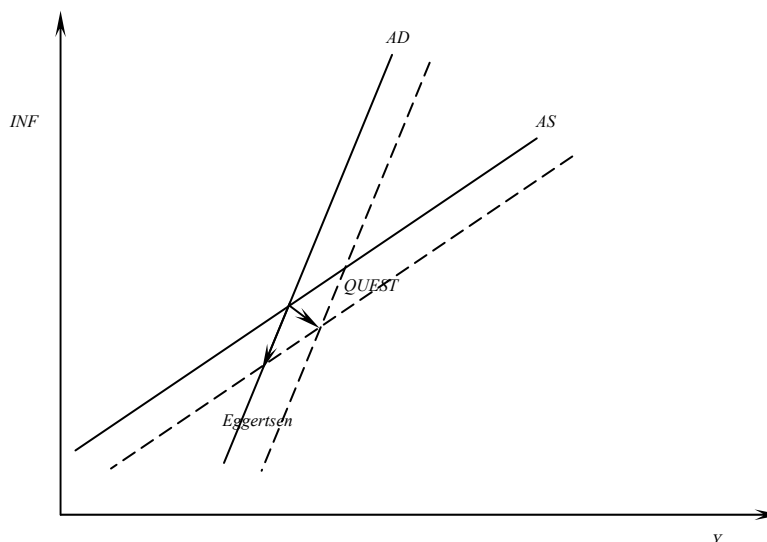
Fiscal policy multipliers become very much larger when the fiscal stimulus is accompanied by monetary accommodation. This is particularly relevant in the current crisis with interest rates at, or close to, their lower zero bound. Under normal circumstances a fiscal stimulus would put upward pressure on inflation and give rise to an increase in interest rates. With monetary accommodation and nominal interest rates held constant, higher inflation will lead to a decrease in real interest rates and this indirect monetary channel amplifies the GDP impact of the fiscal stimulus (Christiano *et al.*, 2009, Erceg and Linde, 2009). As shown in Röger and in 't Veld (2009), under monetary accommodation, both spending and tax multipliers are considerably larger and this effect is amplified in the presence of credit constrained households. For the case where nominal interest rates are kept constant for four quarters, the government consumption multiplier increases by about 40 per cent with collateral constrained households, while it would only increase by about 10 per cent without credit constraints. The latter increase of the multiplier is similar to the change of multiplier obtained by Christiano *et al.* (2009) for the same experiment. This amplification effect of the zero bound multiplier with credit constraints is again due to the strong response of spending of credit constrained households to changes in real interest rates.

The zero bound increases the multiplier substantially for all expenditure and revenue categories, except for labour taxes, where the increase in the multiplier is insignificant. This can easily be explained by the fact that a central mechanism which increases the expenditure multiplier

<sup>5</sup> Note that this assumes the VAT reduction is fully passed through into consumer prices. This intertemporal effect will be strongest in the period just before taxes are raised again (in  $t+1$ ).

at the zero bound, namely an increase in inflation is likely not be present in this case, or is even reversed because a reduction in labour taxes will at least partly be shifted onto firms and thus will end up in lower prices. Nevertheless, this result is in sharp contrast to a result obtained by Eggertson (2009), who claims that the labour tax multiplier at the zero bound will be negative. His argument is based on the assumption that a labour tax reduction will only shift the aggregate supply (AS) curve to the right in the inflation-

GDP space, while the aggregate demand (AD) curve does not shift and is upward sloping in the case of a zero bound. In contrast to this analysis, in the QUEST model there is also a shift of aggregate demand associated with a tax cut (see Figure 1).



**Figure 1**

### The Effect of Cutting Taxes at the Zero Bound

There are at least three important sources for such a shift and two of them are not present in Eggertson's model. First, there is a international competitiveness effect as a result of declining costs, which increases net external demand. Second, there is a shift in corporate investment because of an increase in the marginal product of existing capital because of an increase in employment. Both of them are not present in Eggertson's model. However, a tax reduction also shifts consumer spending either via higher net labour income or higher employment a combination of which must necessarily result from a labour tax cut. These three demand effects taken together make it unlikely that the labour tax multiplier turns negative at the zero bound.

Finally, there are also sizeable positive *spill-over effects* from fiscal stimuli. The effects of a global fiscal stimulus (as in the final three columns in Table 1) are larger than when the EU acts alone. In the current crisis there has been a global fiscal stimulus with large fiscal packages implemented in all G20 countries, and model simulations suggest this resulted in larger multipliers.<sup>6</sup>

The table also indicates the costs of a withdrawal of a stimulus. These also depend on the presence of collateral constraints and on monetary policy accommodation. As long as credit conditions remain tight, and more households face a binding collateral constraint on their borrowing, the larger the costs of a withdrawal of fiscal stimulus. Second, as long as interest rates remain low, monetary policy is less likely to support a fiscal tightening by reducing interest rates. An early withdrawal of fiscal stimulus risks a much sharper contraction in output than when the exit is delayed till monetary conditions have returned to normal.

<sup>6</sup> In the Annex we provide an assessment of the fiscal stimulus measures by member states for 2009 and 2010, as outlined in Section 2, and calculate the estimated GDP impact according to these multipliers depending on whether the stimulus is temporary or permanent (in the latter case multipliers are lower, see Röger and in 't Veld, 2009), and depending on whether the stimulus is accompanied by monetary accommodation.

Table 3

## Fiscal Multipliers

Item	EU Alone			Global Stimulus		
	Without Collat. Constr.	With Collat. Constr.	With Collat. Constr. + Mon. Acc.	Without Collat. Constr.	With Collat. Constr.	With Collat. Constr. + Mon. Acc.
Investment subsidies	1.29	1.36	2.1	1.8	1.93	2.65
Government investment	0.87	0.89	1.22	1.04	1.07	1.33
Government consumption	0.75	0.77	1.17	0.93	0.98	1.33
General transfers	0.18	0.38	0.59	0.23	0.49	0.65
Transfers targetted to collateral constrained hh.	-	0.63	0.98	-	0.81	1.08
Transfers targetted to liquidity constrained hh.	0.63	0.66	1.02	0.79	0.84	1.12
Labour tax	0.23	0.41	0.47	0.26	0.48	0.52
Consumption tax	0.44	0.5	0.76	0.54	0.64	0.84
Corporate income tax	0.02	0.02	0.03	0.03	0.03	0.04

Note: Effect on EU GDP (percent diff. from baseline) for a temporary one year fiscal stimulus of 1 per cent of baseline GDP.

## 6 Simulations of fiscal stimulus in a credit crunch

The global recession has hit the various Member States of the European Union to different degrees. Ireland, the Baltic countries, Hungary and Germany have seen the sharpest contractions, while Poland seems to have been the only country that has so far escaped an outright recession (but has also suffered a sharp slowdown in GDP growth). The financial crisis was initially driven by sharp declines in house and asset prices and a tightening of credit conditions. The extent to which the crisis has been affecting the individual Member States of the European Union strongly depends on their initial conditions and the associated vulnerabilities.<sup>7</sup> In particular the role of overvalued housing markets and oversized construction industries is important. Strong real house price increases have been observed in the past ten years or so in the Baltic countries, and in some cases this has been associated with buoyant construction activity. The greater the dependency of the economy on housing activity, including the dependency on wealth effects of house price increases on consumption, the greater the sensitivity of domestic demand to the financial market shock. Some Member States in Central and Eastern Europe have been particularly hard hit through this wealth channel, notably the Baltic countries.

In order to illustrate the role of fiscal policy in this crisis, we first create a “recession scenario”. This credit crunch scenario is driven by a combination of domestic shocks, existing of a reduction in the loan to value ratio and shocks to arbitrage equations which explain business fixed investment and residential investment (Q-equations) that capture the bursting of a bubble in these asset prices. These shocks to arbitrage equations can be interpreted as non-fundamental shocks or as “bubbles”, as they are shocks to the optimality conditions for investment and house prices. As a declining risk premium in the Q equation for investment indicates the building up of a bubble, a

<sup>7</sup> For a discussion, see European Economy (2009), Economic Crisis in Europe: causes, consequences and responses.

rapid rise in the risk premium indicates the bursting of a bubble. The shocks start in 2008Q1 and are calibrated such that GDP falls by about 2 per cent in 2009.<sup>8</sup>

Figure 2 shows the profile for GDP and the main macroeconomic components, both in the case of debt denominated in domestic currency as well as the case when debt is denominated in foreign currency. The shocks lead to sharp declines in corporate investment and in consumption and residential investment of in particular collateral constrained households. When household debt is denominated in foreign currency, the further tightening of the collateral constraint caused by the depreciation (for new member states *vis-à-vis* the euro) leads to an even sharper decline in spending by these constrained households, even though the depreciation is relatively small. This negative effect on domestic demand is stronger than the boost given to export growth from the devaluation and the decline in GDP is larger. The shocks have a negative impact on tax revenues and raise unemployment benefit spending, leading to an increase in government deficits and debt.

We can now illustrate what fiscal policy can do to mitigate the output losses of this “crisis” scenario. Figure 3 shows the effect of fiscal stimulus measures in this recession scenario. In order to avoid unnecessary duplication, we only show here results for the NE block in the model, representing the Member States in Central and Eastern Europe, and assume household debt is denominated in foreign currencies (euros). The results for the other regional blocks in the model are comparable. We consider first a one year increase in government consumption of 1 per cent of GDP. The stimulus starts in 2009q1 and is announced as a one year shock which is believed to be credible. As the NE block in the model representing the New Member States in Central and Eastern Europe is a smaller and more open economy than the EU aggregate block for which multipliers are reported in Table 2, the fiscal multiplier is significantly smaller here (0.57 compared to 0.77). Nevertheless, the fiscal stimulus helps to cushion the impact of the recession and boost output at least for the duration of the year of the stimulus. In the following year, output falls to slightly below where it would have been in the pre-stimulus recession scenario. The temporary fiscal stimulus worsens the government budget balance and raises the debt-to-GDP ratio further.

Fiscal multipliers are considerably larger when interest rates are near their zero bound as monetary policy can then accommodate the fiscal stimulus by keeping nominal interest rates unchanged and allowing real interest rates to fall due to the increase in inflationary pressures. Monetary policy in the euro area has been able to accommodate the fiscal impulse in this way but in many of the new member states monetary policy has not been able to play this supportive role as interest rates have remained (with the exception of the countries in the euro area – Slovenia and Slovakia). Figure 4 shows the much larger effects when monetary policy can accommodate the fiscal stimulus. Note that the higher growth impact also helps to lessen the impact on government deficits and debt.

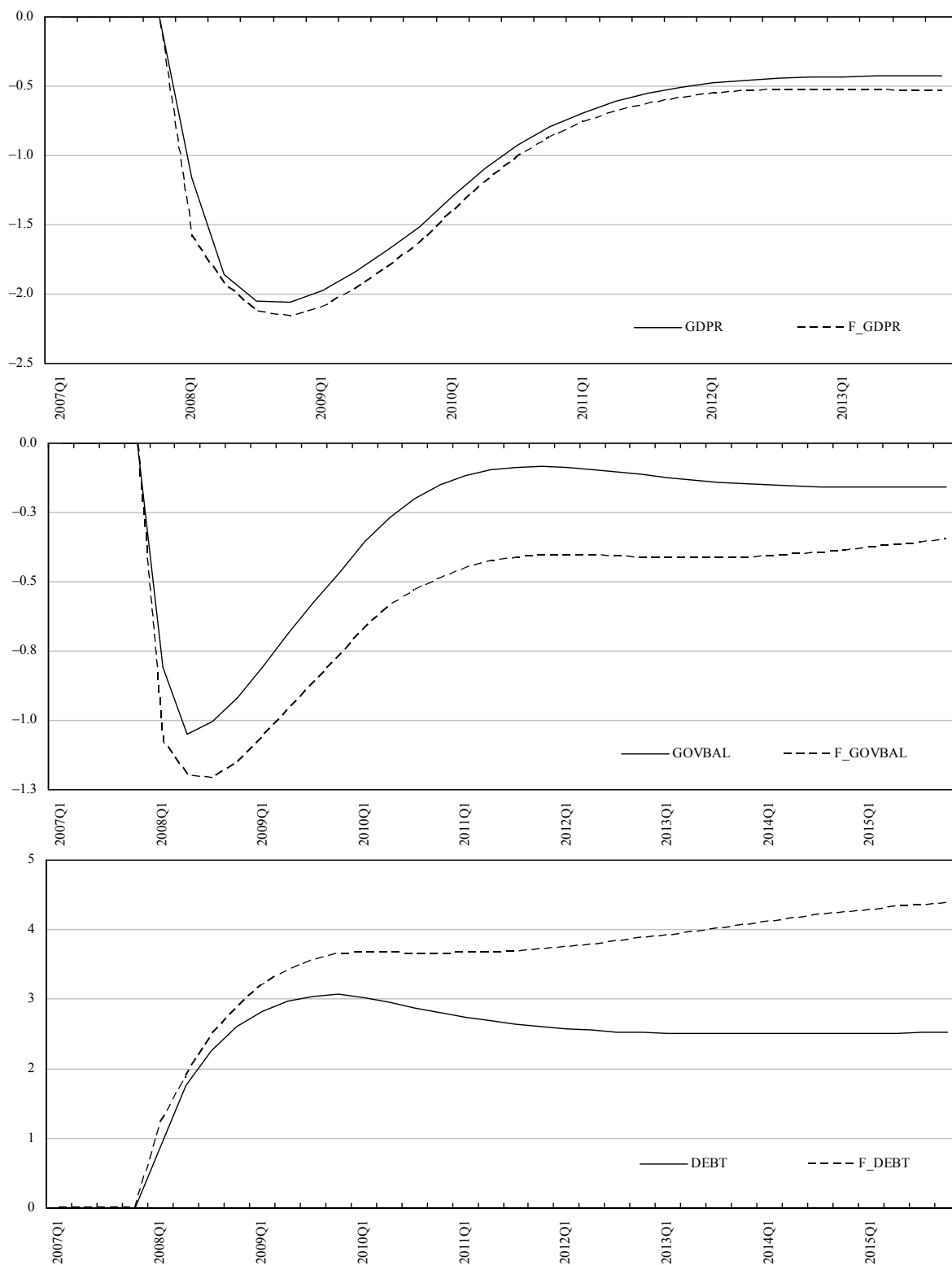
While temporary fiscal stimulus can be effective in supporting output in the short run, a more prolonged stimulus package lasting many more years does not become more powerful. Collateral constrained consumers react strongly to temporary increase in disposable income, but react more like Ricardian households to permanent income shocks, smoothing their income intertemporally.<sup>9</sup> Figure 5 shows the impact of a more prolonged stimulus lasting for three years and then gradually phased out. The impact of this stimulus in the first quarter of the expansion is actually smaller than the impact of a one year stimulus and output falls in the medium term to a lower level. The government deficit now increases for a duration of more than 3 years, and the debt-to-GDP ratio increases by an additional 3 percentage points.

<sup>8</sup> This scenario merely serves as an illustrative baseline against which to show the effects of fiscal policy stimulus, and the scenario is a relatively mild recession, where the slowdown in growth is dampened by higher exports growth due to the depreciating currency. The sharp fall in world growth in 2009 which prevented this cushioning channel from operating is not simulated here.

<sup>9</sup> The differences between temporary and permanent fiscal shocks are shown in Röger and in 't Veld (2009).



Figure 2

**Domestic Credit Crunch Scenario: GDP, Deficit/GDP Ratio, Debt/GDP Ratio**

Note: GDP percentage difference from baseline, Govbal and debt as percent of GDP.  
Dashed line F\_: debt denominated in foreign currency.

Figure 3

## Temporary Fiscal Expansion

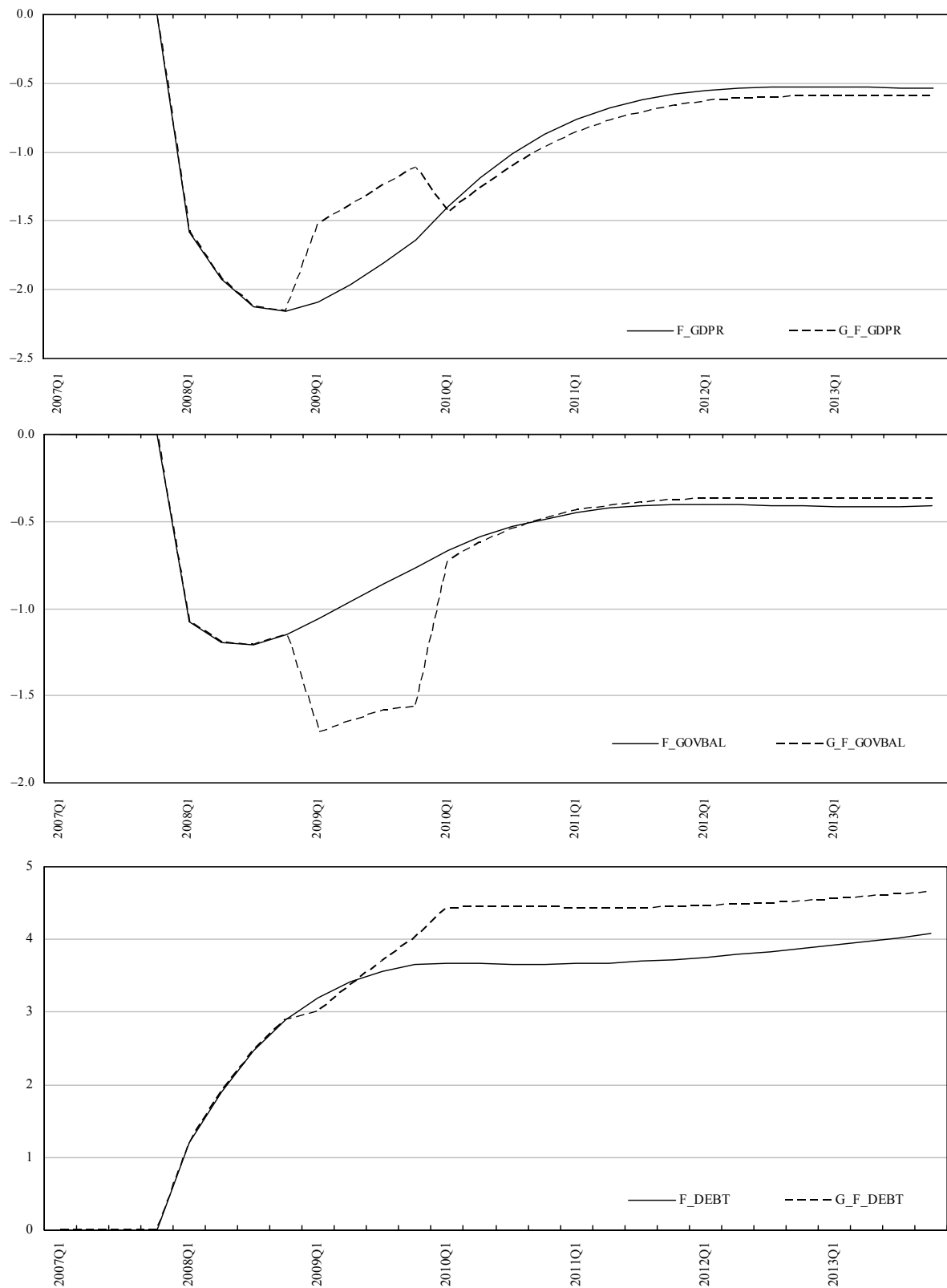


Figure 4

## Temporary Fiscal Expansion with Monetary Accommodation

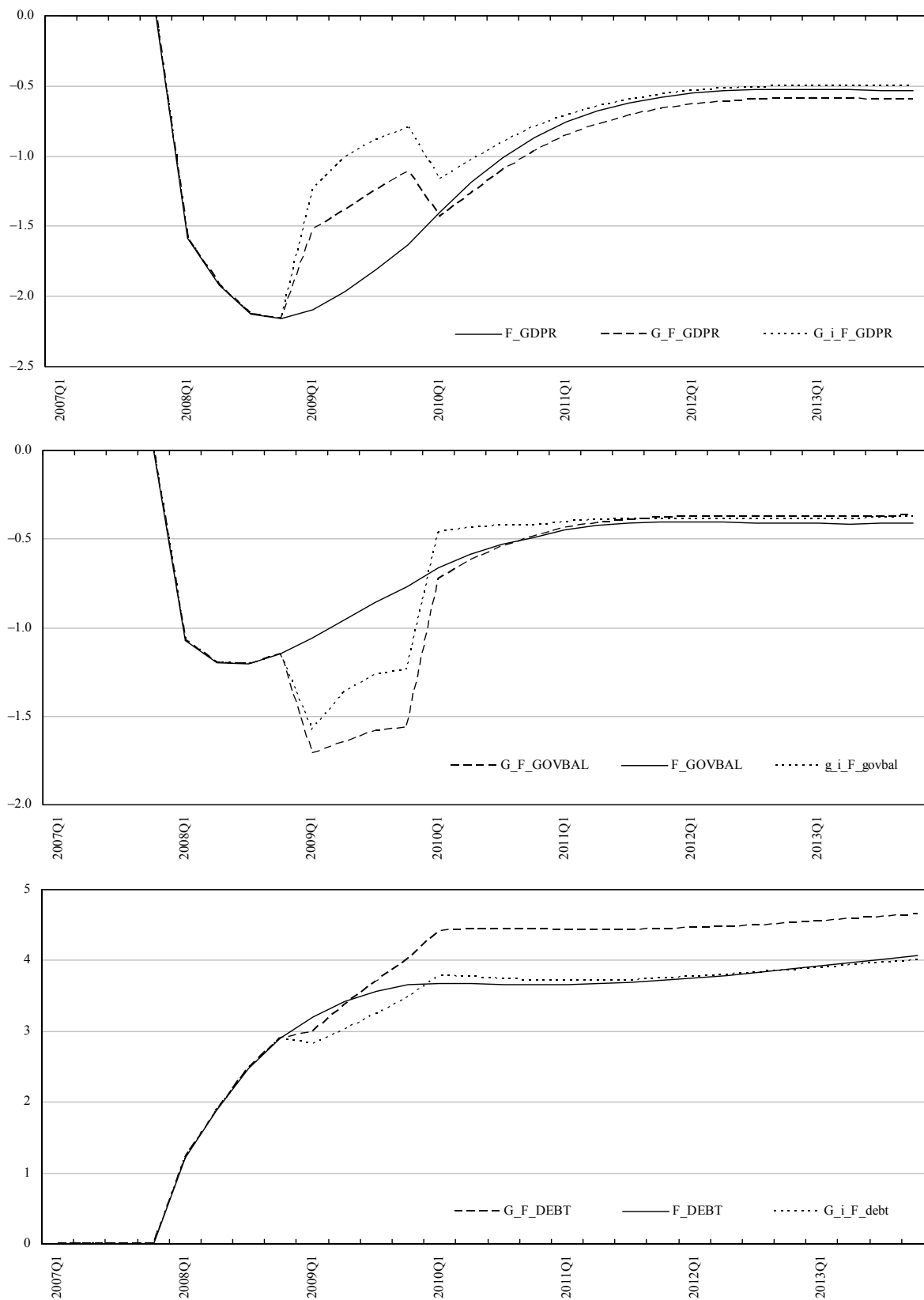


Figure 5

## Temporary vs. Prolonged Fiscal Expansion

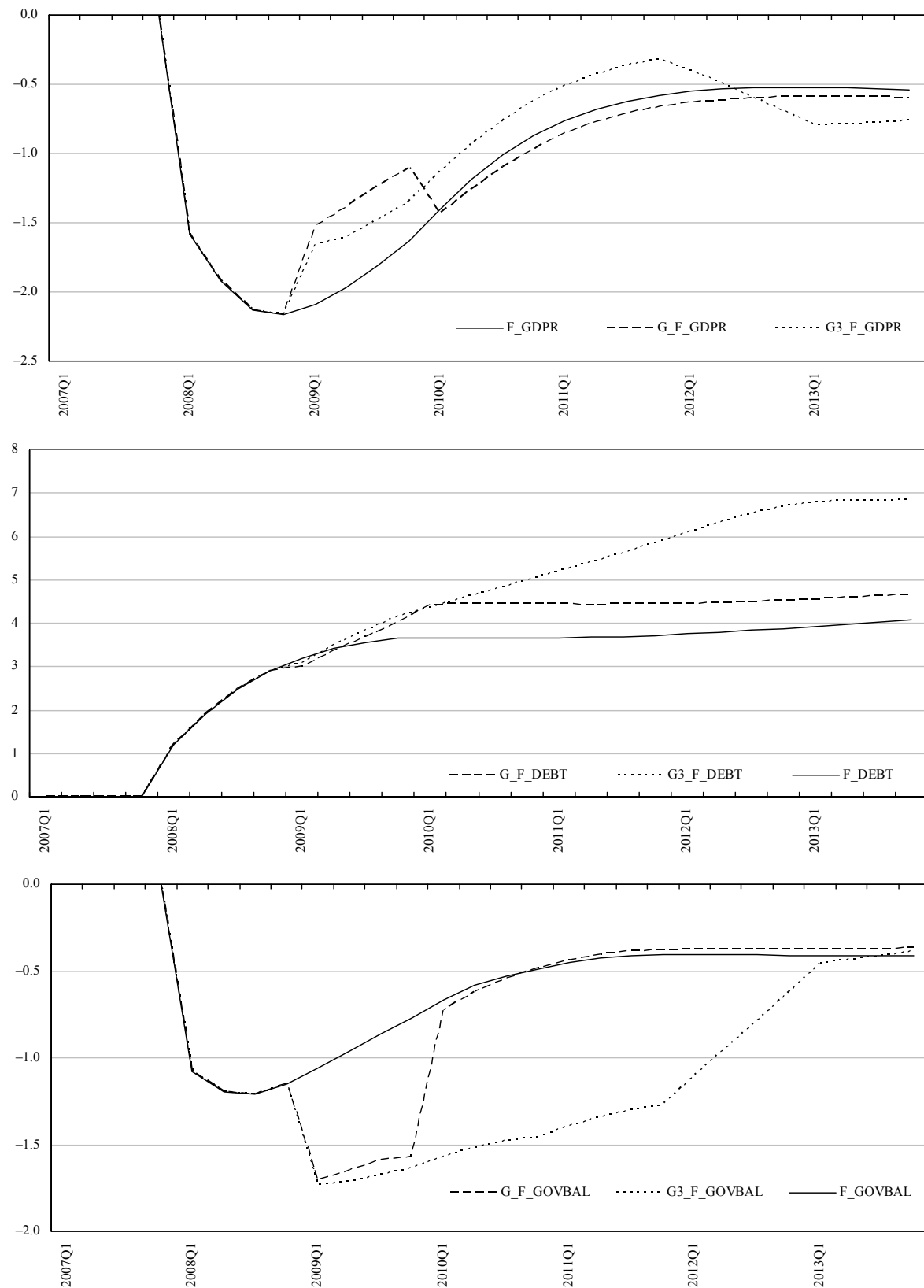
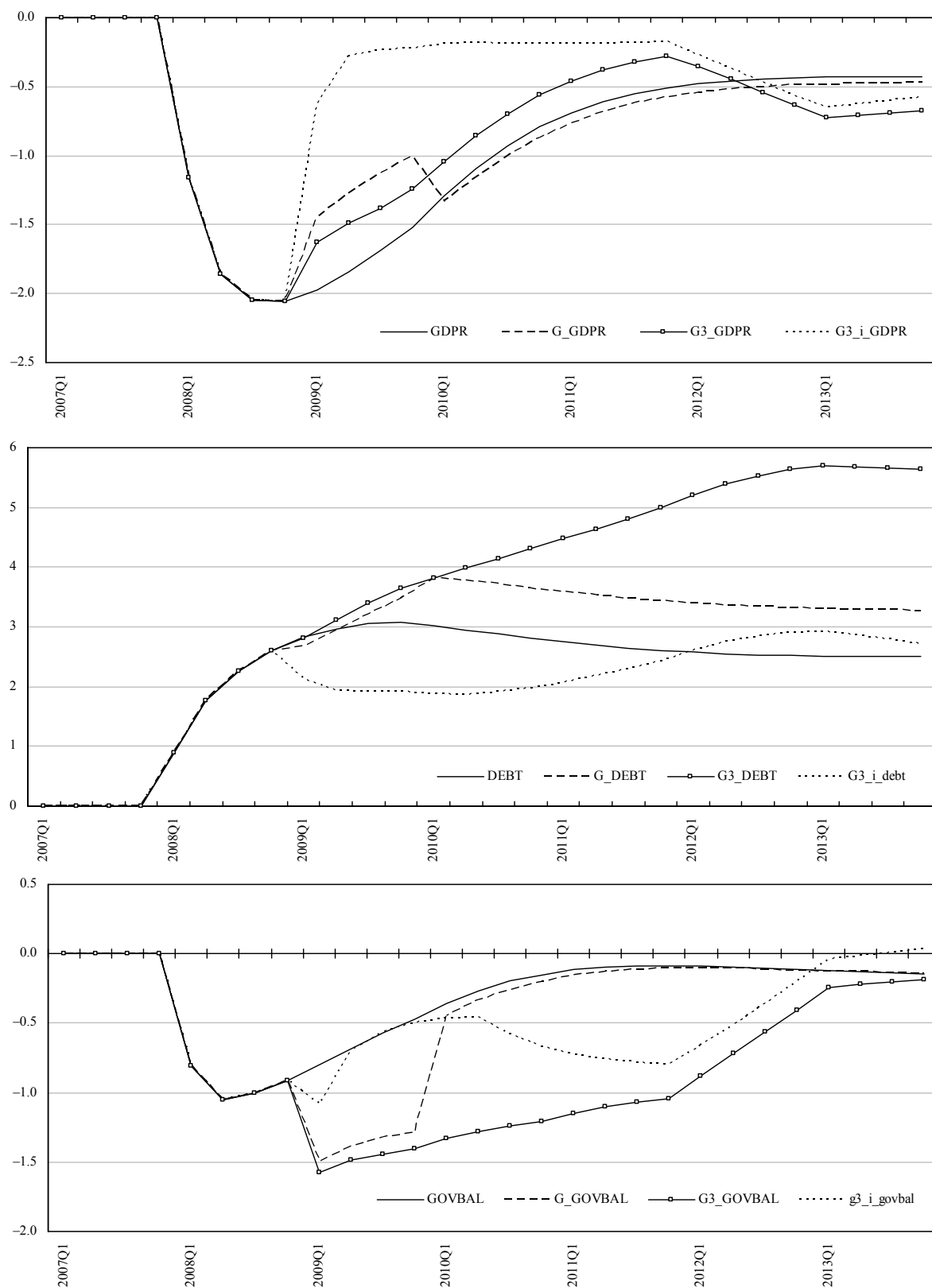


Figure 6

## Temporary vs. Persistent Fiscal Expansion with Monetary Accommodation



However, a longer lasting fiscal stimulus can be significantly more effective if it is accompanied by an accommodative monetary policy. Figure 6 shows the results for this case, when nominal interest rates are kept unchanged. As the fiscal stimulus is longer lasting, more inflationary pressures build up and with unchanged nominal interest rates, real interest rates decline by more. This additional real interest rate effect has a strong impact on output and the combination of the fiscal and monetary stimulus helps to almost offset the effect of the credit crunch shocks. This real interest rate channel is effective in the euro area and the US, where interest rates are at or close to their lower zero bound, and central banks can keep nominal interest rates unchanged. Note also that at least in the short run the strong growth effects in this scenario also help to reduce the deterioration in government balances.

## 7 Conclusions

The paper has described a DSGE model with collateral constrained households and housing investment and used this to examine the effectiveness of fiscal stimulus measures in a credit crisis. The financial accelerator mechanism in the model allows it to be used for an analysis of falling asset prices and tightening credit conditions on the economy. The presence of credit constrained households and the fact that the zero lower bound on nominal interest rates became binding in the crisis, meant that fiscal multipliers were higher than in normal circumstances.

While the above suggests a larger role for fiscal policy in the euro area, in many of the Member States in Central and Eastern Europe interest rates were generally higher. As it is less likely that monetary policy in these countries can accommodate the fiscal impulse, fiscal policy is less effective than in countries where nominal interest rates can be kept unchanged and real interest rates are allowed to fall. However, even when monetary policy cannot accommodate the fiscal impulse, well-designed fiscal stimulus measures can still help to soften the impact of the crisis and mitigate the detrimental effects on (potential) growth.

A further analysis should shed light on the appropriate exit strategy. As noted, many of the countries most affected by the crisis, particularly among the new Member States, have had very limited room to implement stimulus measures. To the contrary, they often have predominantly adopted consolidation measures with a view to avoiding a further fall-out from the crisis. How such consolidation efforts are best designed according to the DSGE modelling framework used in this paper, would be the subject of future research.

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**FISCAL AND MONETARY POLICY INTERACTION:  
A SIMULATION-BASED ANALYSIS OF A TWO-COUNTRY  
NEW KEYNESIAN DSGE MODEL WITH HETEROGENEOUS HOUSEHOLDS**

*Marcos Valli Jorge\* and Fabia A. de Carvalho\**

*This paper models a fiscal policy that pursues primary balance targets to stabilize the debt-to-GDP ratio in an open and heterogeneous economy where firms combine public and private capital to produce their goods. The model extends the European NAWM presented in Coenen et al. (2008) and Christoffel et al. (2008) by broadening the scope for fiscal policy implementation and allowing for heterogeneity in labor skills. The domestic economy is also assumed to follow a forward looking Taylor-rule consistent with an inflation targeting regime. We correct the NAWM specification of the final-goods price indices, the recursive representation of the wage setting rule, and the wage distortion index. We calibrate the model for Brazil to analyze some implications of monetary and fiscal policy interaction and explore some of the implications of fiscal policy in this class of DSGE models.*

## **1 Introduction**

DSGE models are now part of the core set of tools used by major central banks to assess the widespread effects of policy making. Building mostly on the recent New Keynesian literature (Monacelli, 2005, Galí and Monacelli, 2008, Smets and Wouters, 2003, Adolfson *et al.*, 2007, among others), these models have been further enriched in several aspects by the inclusion of alternative pricing assumptions, imperfect competition in distinct economic sectors, international financial linkages, and financial frictions. However, as Ratto *et al.* (2009) argue, “so far, not much work has been devoted towards exploring the role of fiscal policy in the (DSGE) New-Keynesian model”.<sup>1</sup>

DSGE models are a promising tool to understand the outcome of interactions between fiscal and monetary policies. The recent trend in modeling the fiscal sector in New Keynesian DSGE models is to include non-Ricardian agents and activist fiscal policies (Gunter and Coenen, 2005; Mourougane and Vogel, 2008; and Ratto *et al.*, 2009) mostly to assess the effects of shocks to government consumption on the aggregate economy, as well as the distributional effects of fiscal policies. However, the practice of fiscal policy usually goes beyond the decisions on consumption expenditures. The government often intervenes in the economy through public investment with important externalities upon private investment.

Ratto *et al.* (2009) are a recent attempt to account for the strategic role of public investment in policy decisions in a DSGE setup. They introduce a rule for public investment that responds to the business cycle and assume that public capital interferes in the productivity of private firms, but does not belong to factor decisions.

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<sup>1</sup> Ratto, Röger and in 't Veld (p. 222). The italics are ours.

In this paper, we depart from the assumption that public investment is a type of externality. We assume that firms can rent capital services from a competitive market of private and public capital goods. The optimal composition of capital services will depend on the elasticity of substitution between both types of capital goods and on a parameter that captures the economy's "dependence" on public infrastructure. Households and the government have different investment agenda, and are faced with distinct efficiency in the transformation of investment to capital goods.

The reasoning for introducing public capital goods in this manner can be rationalized as follows. In our model, intermediate goods firms are the entities that actually use public capital. In the real world, there are both (mixed-capital) firms and government agencies utilizing capital owned by the government. By letting public capital enter firms' decisions, we believe we are approximating our model to the reality of a mixed-capital economy. The production technology distinguishes between the quality of each type of capital, and as such, the demand for public capital reacts to deviations of its rental rate to the calibrated value, which we assume to be subsidized in the steady state. In the real world, the government makes decisions on investment, and the efficiency with which such investment is transformed into capital goods can differ from the efficiency of the private sector's investment. In our model we empowered our government to decide on its public investment.

Our model builds on ECB's New Area Wide Model (NAWM) presented in Coenen *et al.* (2008) and Christoffel *et al.* (2008), hereinafter referred to as CMS and CCW respectively. However, there are important distinctions. First, we change the fiscal set-up. In the ECB NAWM, government consumption and transfers follow autoregressive rules. In our model, we introduce a fiscal policy rule that tracks primary surplus targets, that responds to deviations on the debt-to-GDP ratio and that also portrays an anti-cyclic response to economic conditions. In addition, we let fiscal transfers to be biased in favor of one of the household groups, and also introduce government investment through an autoregressive rule that also pursues an investment target. With a rule for the primary surplus, for government transfers and for public investment, government consumption thus becomes endogenous. This framework better approximates the theoretical setting of these models to the current practice of fiscal policy in a number of countries, including Brazil.

Second, we augment the labor market by introducing heterogeneity in labor skills. In Brazil, labor contracts are not usually flexible as to adjustments in daily hours worked. The most usual contracts set an 8-hour workday. Therefore, it seems reasonable to allow for the possibility that members of different social classes in average earn different wages for the same amount of hours worked.

Third, we correct some equations shown in CMS and CCW. The first refers to the specification of consumer and investment price indices, which we correct to guarantee that the producers of final consumption and investment goods operate under perfect competition. These modifications yield a representation of the economy's resource constraint that also differs from the one presented in CMS and CCW. We also correct the recursive representation of the wage setting rule and the wage distortion index.

Fourth, we introduce a deterministic spread between the interest rates of domestically and internationally traded bonds to account for the risk premium that can be significant in emerging economies.

Finally, monetary policy in the domestic economy is modeled with a forward looking rule to better approximate the conduct of policy to an inflation targeting framework.

We calibrate the structural parameters of our model for the Brazilian economy and the rest of the world (USA+EURO), leaving the monetary and fiscal policy rules of the rest of the world as specified in CMS and CCW. We assess the impulse responses to arbitrary magnitudes of the shocks

and analyze the implications of the interaction between fiscal and monetary policies. In particular, we assess the macroeconomic and distributional effects of shocks to government investment, primary surplus, transfers, and monetary policy, and analyze the effects of concomitant shocks to the fiscal and monetary policy rules. We proceed with a sensitivity analysis of the impact of varying degrees of rigor in the implementation of the fiscal rule, of fiscal commitment to a sustainable path of the public debt, and of the commitment of the monetary policy to the inflation target.

The adopted calibration of fiscal and monetary policy rules lies in a region of monetary activeness and fiscal passiveness. However, the model also shows stable equilibria under alternative calibrations where, in contrast, monetary policy is passive and fiscal policy is active. Apart from the specifications where the fiscal rule has a mute response to the public debt, active fiscal policies bring about strong cyclicalities in the impulse responses.

One of the important contributions of this paper is to show that an expansionist shock to the primary surplus is not equivalent to a shock to government consumption, as the former attains with a mix of cuts in both government consumption and investment. We also show that each one of the fiscal shocks – primary surplus, government investment and government transfers – has a distinct impact on the model dynamics.

Under the calibrated model, a shock that reduces the primary surplus has very short lived expansionist effects on output growth. A government investment shock, on the other hand, initially depresses output growth, since compliance with the fiscal rule requires government consumption to reduce. However, the government investment shock enables output growth expansion still within the first year after the shock. The inflationary effects of the shocks to the primary surplus and to government investment are mild, yet relatively long-lived. Shocks to government transfers have very short lived effects on economic growth. With the fiscal rule in place, an increase in government transfers induces some reduction in government consumption, which presses down production. Under our calibration, the distributional effects of all fiscal shocks end up being small, contrary to the findings of CMS and CCW likely due to the specification we adopted for labor heterogeneity.

We also experiment with different specifications of monetary and fiscal policy rules, and show that they have important effects on the models' dynamic responses and predicted moments.

Higher commitment to the stabilization of the public debt strengthens the contractionist impact of the monetary shock. The volatility of consumer price inflation increases, as does the correlation between inflation and output growth. Strongly (and negatively) correlated policy shocks also dampen the contractionist effect of the monetary policy shock.

We find a degree of fiscal rigor that jointly minimizes the influence of the primary surplus shock on inflation and of the monetary policy on GDP growth. As expected, a more rigorous implementation of the primary surplus rule implies lower variance of inflation and output growth, and significantly increases the influence of the monetary policy shock onto the variances of consumer price inflation and output growth.

Increasing the monetary policy commitment to the inflation target significantly reduces the volatility of inflation and its correlation with output growth. The variance of output growth poses a mild reduction. However, a higher commitment to the inflation target results in a higher stake of the variance of inflation being explained by the fiscal shock.

The model is also simulated under alternative monetary policy rules. Augmenting the rule to include an explicit reaction to the exchange rate variability or the output growth adds sluggishness to the reversal of inflation to the steady state after a monetary policy shock. However, the initial impact of the shock onto the economic activity is milder (yet more persistent). By activating the

policy shocks only, the response to the exchange rate volatility reduces the variance of inflation, output growth and the exchange rate. The monetary policy shock has a smaller effect on output variation and gains influence on the volatility of inflation.

On the other hand, a monetary policy rule that responds to output growth reduces output growth volatility, but increases the variance of consumer price inflation and the exchange rate. Under this policy rule, a shock to monetary policy loses influence over inflation variance, but also reduces its stake in the variance of output growth and the exchange rate.

The paper is organized as follows. Section 2 provides an overview of the model, focusing on the extensions proposed to the NAWM. Section 3 details the calibration strategy and the normalization to attain stationary representations of the aggregated variables. Section 4 analyses the impulse responses of the model and experiments with distinct types of policy orientation. The last section concludes the paper.

## 2 The model

In the model, there are two economies of different sizes that interact in both goods and financial markets. Except for monetary and fiscal policy rules, both economies are symmetric with respect to the structural equations that govern their dynamics, but the structural parameters are allowed to differ across countries.

Each economy is composed of households, firms, and the government. Households are distributed in two continuous sets that differ as to their access to capital and financial markets, and also to their labor skills. Families in the less specialized group, hereinafter referred to as group  $I = [1-\omega, 1]$ , can smooth consumption only through non-interest bearing money holdings, whilst the other group of households in group  $I = [0, 1-\omega]$ , with more specialized skills, has full access to capital, and to domestic and international financial markets. The differentiation in households' ability to smooth consumption over time, a feature adopted in CMS and CCW, allows for breaking the Ricardian Equivalence in this model. Within their groups, households supply labor in a competitive monopolistic labor market to produce intermediate goods. There are Calvo-type wage rigidities combined with hybrid wage indexation rules.

Firms are distributed in two sets. The first produces intermediate goods for both domestic and foreign markets, and operates under monopolistic competition with Calvo-type price rigidities combined with hybrid price indexation. The other set is composed of three firms, each one of them producing one single type of final good: private consumption, public consumption, or investment goods. Final goods firms are assumed to operate under perfect competition.

The government comprises a monetary authority that sets nominal interest rates and issues money, and a fiscal authority that levies taxes on most economic activities, and endogenously adjusts its consumption expenditures to comply with its investment, distributional transfers, and primary surplus rules.

A detailed derivation of the model is available in Appendix H. In the remaining of this section, we correct important equations in CMS and CCW and model a fiscal sector that is more in line with the current practice of fiscal policy in a wide number of countries. Public investment has spillover effects over private investment and affects the market for capital goods.

## 2.1 Wage setting

Household  $i \in I = [0, 1 - \omega]$  chooses consumption  $C_{i,t}$  and labor services  $N_{i,t}$  to maximize the separable intertemporal utility with external habit formation:

$$E_t \left\{ \sum_{k=0}^{\infty} \beta^k \left[ \frac{1}{1-\sigma} (C_{i,t+k} - \kappa C_{i,t+k-1})^{1-\sigma} - \frac{1}{1+\zeta} (N_{i,t+k}^{1+\zeta}) \right] \right\} \quad (1)$$

subject to the budget constraint:

$$\begin{aligned} & (1 + \tau_t^C + \Gamma_v(v_{i,t})) P_{C,t} C_{i,t} + P_{I,t} I_{i,H,t} + R_t^{-1} B_{i,t+1} \\ & + \left( (1 - \Gamma_{B^F}(B_{I,t}^F)) rp \cdot R_{F,t} \right)^{-1} S_t B_{i,t+1}^F + M_{i,t} + \Xi_{i,t} + \Phi_{i,t} \\ = & (1 - \tau_t^N - \tau_t^{W_h}) W_{i,t} N_{i,t} + (1 - \tau_t^K) [u_{i,t} R_{K,H,t} - \Gamma_u(u_{i,t}) P_{I,t}] K_{i,H,t} + \tau_t^K \cdot \delta \cdot P_{I,t} \cdot K_{i,H,t} \\ & + (1 - \tau_t^D) D_{i,t} + TR_{i,t} - T_{i,t} + B_{i,t} + S_t B_{i,t}^F + M_{i,t-1} \end{aligned} \quad (2)$$

where  $W_{i,t}$  is the wage earned by the household for one unit of labor services,  $I_{i,H,t}$  is private investment in capital goods,  $B_{i,t+1}$  are domestic government bonds,  $M_{i,t}$  is money,  $B_{i,t+1}^F$  are foreign private bonds,  $S_t$  is the nominal exchange rate,  $R_{F,t}$  is the interest rate of the foreign bonds,  $rp$  is the steady state spread between interest rates of domestically and internationally traded bonds,  $\Gamma_{B^F}(B_{I,t}^F)$  is an extra risk premium when the external debt deviates from the steady state,  $\Gamma_v(v_{i,t})$  is a transaction cost on consumption,  $v_{i,t}$  is the money-velocity of consumption,  $D_{i,t}$  are dividends,  $K_{i,H,t}$  is the private capital stock,  $u_{i,t}$  is capital utilization,  $\Gamma_u(u_{i,t})$  is the cost of deviating from the steady state rate of capital utilization,  $R_{K,H,t}$  is the gross rate of the return on private capital,  $TR_{i,t}$  are transfers from the government,  $\Xi_{i,t}$  is a lump sum rebate on the risk premium introduced in the negotiation of international bonds, and  $\Phi_{i,t}$  is the stock of contingent securities negotiated within group  $I$ , which act as an insurance against risks on labor income. Taxes are  $\tau_t^C$  (consumption),  $\tau_t^N$  (labor income),  $\tau_t^{W_h}$  (social security),  $\tau_t^K$  (capital income),  $\tau_t^D$  (dividends) and  $T_{i,t}$  (lump sum, active only for the foreign economy). The parameter  $\kappa$  is the external habit persistence,  $\beta$  is the intertemporal discount factor,  $\frac{1}{\sigma}$  is the intertemporal elasticity of consumption substitution,  $\frac{1}{\zeta}$  is the elasticity of labor effort relative to the real wage, and  $\delta$  is the depreciation of capital. Price indices are  $P_{C,t}$  and  $P_{I,t}$ , the prices of final consumption and investment goods, respectively. Cost functions are detailed in Appendix A.

Households in group  $J$  maximize a utility function analogous to (1), but constrained on their investment choices, allowed to transfer wealth from one period to another only through non-interest bearing money holdings.

Within each group, households compete in a monopolistic competitive labor market. By setting wage  $W_{i,t}$ , household  $i$  commits to meeting any labor demand  $N_{i,t}$ . Wages are set *à la* Calvo, with a probability  $(1 - \xi_I)$  of optimizing each period. Households that do not optimize

readjust their wages based on a geometric average of realized and steady state inflation

$\bar{W}_{i,t} := \left( \frac{P_{C,t-1}}{P_{C,t-2}} \right)^{\chi_I} \pi_C^{1-\chi_I} W_{i,t-1}$ . Optimizing households in group  $I$  choose the same wage  $\tilde{W}_{i,t}$ , which we denote  $\tilde{W}_{I,t}$ .

Household  $i$ 's optimization with respect to the wage  $\tilde{W}_{i,t}$  yields the first order condition, which is the same for every optimizing household:

$$E_t \left\{ \sum_{k=0}^{\infty} (\xi_I \beta)^k N_{i,t+k} \left[ \Lambda_{i,t+k} (1 - \tau_{t+k}^N - \tau_{t+k}^{W_h}) \frac{\tilde{W}_{I,t}}{P_{C,t+k}} \left( \frac{P_{C,t+k-1}}{P_{C,t-1}} \right)^{\chi_I} \pi_C^{(1-\chi_I)k} - \frac{\eta_I}{\eta_I - 1} (N_{i,t+k})^\zeta \right] \right\} = 0 \quad (3)$$

where  $\frac{\Lambda_{i,t}}{P_{C,t}}$  is the Lagrange multipliers for the budget constraint, and  $\eta_I / (\eta_I - 1)$  is the after-tax

real wage markup, in the absence of wage rigidity (when  $\xi_I \rightarrow 0$ ), with respect to the marginal rate of substitution between consumption and leisure. The markup results from the worker's market power to set wages.

Equation (3) can be expressed in the following recursive form, which corrects the one presented in CMS after including the multiplicative constant  $(1 - \omega)^\zeta$  on the left hand side. This constant arises from the labor demand equation:

$$(1 - \omega)^\zeta \left( \frac{\tilde{W}_{I,t}}{P_{C,t}} \right)^{1+\eta_I \cdot \zeta} = \frac{\eta_I}{\eta_I - 1} \cdot \frac{F_{I,t}}{G_{I,t}} \quad (4)$$

where:

$$F_{I,t} := \left( \left( \frac{W_{I,t}}{P_{C,t}} \right)^{\eta_I} N_t^I \right)^{1+\zeta} + \xi_I \cdot \beta \cdot E_t \left\{ \left( \frac{\pi_{C,t+1}}{\pi_{C,t}^{\chi_I} \pi_C^{1-\chi_I}} \right)^{\eta_I (1+\zeta)} \cdot F_{I,t+1} \right\}$$

$$G_{I,t} := \Lambda_{I,t} (1 - \tau_t^N - \tau_t^{W_h}) \left( \frac{W_{I,t}}{P_{C,t}} \right)^{\eta_I} N_t^I + \xi_I \cdot \beta \cdot E_t \left\{ \left( \frac{\pi_{C,t+1}}{\pi_{C,t}^{\chi_I} \pi_C^{1-\chi_I}} \right)^{\eta_I - 1} \cdot G_{I,t+1} \right\}$$

and  $N_t^I$  is households group  $I$  aggregate labor demanded by firms, and  $W_{I,t}$  is household group  $I$ 's aggregate wage index. Superscripts in the labor variable represent demand. Subscripts represent supply.

The derivation of equation (4) is detailed in Appendix B.

## 2.2 Production

There are two types of firms in the model: producers of tradable intermediate goods and

producers of non-tradable final goods.

### 2.2.1 Intermediate goods firms

A continuum of firms, indexed by  $f \in [0,1]$ , produce tradable intermediate goods  $Y_{f,t}$  under monopolistic competition. We depart from the set-up in CMS by introducing mixed capital as an input to the production of these goods. We assume that firms competitively rent capital services from the government,  $K_{G,f,t}^S$ , and from households in group  $I$ ,  $K_{H,f,t}^S$ , and transform them into the total capital input  $K_{f,t}^S$  through the following CES technology:

$$K_{f,t}^S = \left[ (1 - \omega_g)^{1-\eta_g} \cdot (K_{H,f,t}^S)^{\frac{\eta_g-1}{\eta_g}} + (\omega_g)^{1-\eta_g} \cdot (K_{G,f,t}^S)^{\frac{\eta_g-1}{\eta_g}} \right]^{\frac{\eta_g}{\eta_g-1}} \quad (5)$$

where  $\omega_g$  is the economy's degree of dependence on government investment, and  $\eta_g$  stands for the elasticity of substitution between private and public goods, and also relates to the sensitivity of demand to the cost variation in each type of capital.

In addition to renting capital services, intermediate goods firms hire labor  $N_{f,t}^D$  from all groups of households to produce the intermediate good  $Y_t$  using the technology:

$$Y_{f,t} = z_t \cdot (K_{f,t}^S)^\alpha \cdot (z n_t \cdot N_{f,t}^D)^{1-\alpha} - \psi \cdot z n_t \quad (6)$$

where  $\psi \cdot z n_t$  is a cost, which in steady state is constant relative to the output. The constant  $\psi$  is chosen to ensure zero profit in the steady state, and  $z_t$  and  $z n_t$  are respectively (temporary) neutral and (permanent) labor-augmenting productivity shocks that follow the processes:

$$\ln(z_t) = (1 - \rho_z) \cdot \ln(z) + \rho_z \cdot \ln(z_{t-1}) + \varepsilon_{z,t} \quad (7)$$

and:

$$\frac{z n_t}{z n_{t-1}} = (1 - \rho_{zn}) \cdot gy + \rho_{zn} \cdot \frac{z n_{t-1}}{z n_{t-2}} + \varepsilon_{zn,t} \quad (8)$$

where  $z$  is the stationary level of total factor productivity,  $gy$  is the steady state growth rate of labor productivity,  $\rho_z$  and  $\rho_{zn}$  are parameters, and  $\varepsilon_{z,t}$  and  $\varepsilon_{zn,t}$  are exogenous white noise processes.

In equilibrium,  $K_{f,t}^S = u_{I,t} K_{f,t}$ , where  $K_{f,t}$  is the stock of capital used by firm  $f$ .

For a given total demand for capital services, the intermediate firm minimizes the total cost of private and public capital services, solving:

$$\min_{K_{H,f,t}^S, K_{G,f,t}^S} R_{K,t}^H K_{H,f,t}^S + R_{K,t}^G K_{G,f,t}^S \quad (9)$$

subject to (5).

The rental rate on private capital services results from the equilibrium conditions in the private capital market. The rental rate on government capital services also results from equilibrium conditions, this time in the market for government capital goods, but, in steady state, we calibrate  $\omega_g$  in order to have the rental rate of public capital goods exclusively covering expenses with capital depreciation, so as to portrait the idea that public capital is usually subsidized.

First order conditions to this problem yield the average rate of return on capital and the aggregate demand functions for each type of capital goods services:

$$R_{K,t} = \left( (1 - \omega_g) \cdot (R_{K,t}^H)^{1-\eta_g} + \omega_g \cdot (R_{K,t}^G)^{1-\eta_g} \right)^{\frac{1}{1-\eta_g}} \quad (10)$$

$$K_{G,t}^S = \omega_g \left( \frac{R_{G,t}}{R_{K,t}} \right)^{-\eta_g} K_t^S \quad (11)$$

$$K_{H,t}^S = (1 - \omega_g) \left( \frac{R_{H,t}}{R_{K,t}} \right)^{-\eta_g} K_t^S \quad (12)$$

All firms are identical since they solve the same optimization problem. The aggregate composition of capital services rented by intermediate goods firms can be restated by suppressing the subscript “ $f$ ” from (5), using (10), and aggregating the different types of capital services across firms:

$$K_t^S = \left( (1 - \omega_g)^{1/\eta_g} (K_{H,t}^S)^{\frac{\eta_g-1}{\eta_g}} + \omega_g^{1/\eta_g} (K_{G,t}^S)^{\frac{\eta_g-1}{\eta_g}} \right)^{\frac{\eta_g}{\eta_g-1}} \quad (15)$$

We also depart from CMS by introducing differentiated labor skills in the model. We reason that individuals with a lower degree of formal education are usually more constrained on their ability to analyze more sophisticated investment possibilities. In addition, it also seems reasonable to hypothesize that individuals with a lower degree of education will also have lower level of labor skills. Therefore, we make the assumption that the group of households that is investment-constrained in our model also has lower labor skills. This modeling strategy allows for a steady state where skillful workers can earn more yet working the same amount of hours as the less skilled. In addition to the labor differentiation arising from the assumption of monopolistic competition in the labor market, the non-homogeneity that we introduce here within household groups generates important differences in the impulse-responses of the model compared to CMS, as we show in Section 4.

The labor input used by firm  $f$  in the production of intermediate goods is a composite of labor demanded to both groups of households. In addition to the population-size adjustment ( $\omega$ ) that CMS add to the firm’s labor demand, we add the parameter  $v_\omega \in [0, 1/\omega]$  to introduce a bias in favor of more skilled workers. The resulting labor composite obtains from the following transformation technology:

$$N_{f,t}^D := \left( (1 - v_\omega \omega)^{1/\eta} (N_{f,t}^I)^{1-1/\eta} + (v_\omega \omega)^{1/\eta} (N_{f,t}^J)^{1-1/\eta} \right)^{\eta/(\eta-1)} \quad (14)$$

where:



$$N_{f,t}^I := \left[ \left( \frac{1}{1-\omega} \right)^{1/\eta_I} \int_0^{1-\omega} (N_{f,t}^i)^{1-1/\eta_I} di \right]^{\eta_I/(\eta_I-1)} \quad (15)$$

$$N_{f,t}^J := \left[ \left( \frac{1}{\omega} \right)^{1/\eta_J} \int_{1-\omega}^1 (N_{f,t}^j)^{1-1/\eta_J} dj \right]^{\eta_J/(\eta_J-1)} \quad (16)$$

and where  $\eta$  is the price-elasticity to demand for specific labor bundles,  $\eta_I$  and  $\eta_J$  are the price-elasticities for specific labor varieties. The special case when  $v_\omega = 1$  corresponds to the equally skilled workers assumption, as in CMS.

Taking average wages ( $W_{I,t}$  and  $W_{J,t}$ ) in both groups as given, firms choose how much to hire from both groups of households by minimizing total labor cost  $W_{I,t}N_{f,t}^I + W_{J,t}N_{f,t}^J$  subject to (14). It follows from first order conditions that the aggregate wage is:

$$W_t = \left[ (1-v_\omega \cdot \omega) \cdot W_{I,t}^{1-\eta} + v_\omega \cdot \omega \cdot W_{J,t}^{1-\eta} \right]^{\frac{1}{1-\eta}} \quad (17)$$

and the aggregate demand functions for each group of households are:

$$N_t^I = (1-v_\omega \cdot \omega) \cdot \left( \frac{W_{I,t}}{W_t} \right)^{-\eta} \cdot N_t^D \quad (18)$$

$$N_t^J = v_\omega \cdot \omega \cdot \left( \frac{W_{J,t}}{W_t} \right)^{-\eta} \cdot N_t^D \quad (19)$$

### 2.2.2 Final goods firms

As in CMS, there are three firms producing non-tradable final goods. One specializes in the production of private consumption goods, another in public consumption goods, and the third in investment goods. Except for the firm that produces public consumption goods, all final goods producers combine domestic and imported intermediate goods in their production. The differentiation of public consumption goods stems from the evidence that usually the greatest share of government consumption is composed of services, which are heavily based on domestic human resources.

The existence of an adjustment cost to the share of imported goods in the production of final goods invalidates the standard result that the Lagrange multiplier of the technology constraint equals the price index of final goods. In this new context, we derive below the price index of private consumption goods and investment goods to ensure that final goods firms operate under perfect competition. The pricing of public consumption goods is exactly the same as in CMS.

#### 2.2.2.a Private consumption goods

To produce private consumption goods  $Q_t^C$ , the firm purchases bundles of domestic  $H_t^C$  and foreign  $IM_t^C$  intermediate goods. Whenever it adjusts its imported share of inputs, the firm

faces a cost,  $\Gamma_{IM^C}(IM_t^C / Q_t^C)$ , detailed in Appendix A. Letting  $\nu_C$  denote the bias towards domestic intermediate goods, the technology to produce private consumption goods is:

$$Q_t^C := \left\{ (\nu_C)^{1/\mu_C} [H_t^C]^{1-1/\mu_C} + (1-\nu_C)^{1/\mu_C} [(1-\Gamma_{IM^C}(IM_t^C / Q_t^C))IM_t^C]^{1-1/\mu_C} \right\}^{\mu_C/(\mu_C-1)} \quad (20)$$

where:

$$H_t^C := \left( \int (H_{f,t}^C)^{1-1/\theta} df \right)^{\theta/(\theta-1)}$$

$$IM_t^C := \left( \int_0^1 (IM_{f^*,t}^C)^{1-1/\theta^*} df^* \right)^{\theta^*/(\theta^*-1)}$$

The firm minimizes total input costs:

$$\min_{H_t^C, IM_t^C} P_{H,t} \cdot H_t^C + P_{IM,t} \cdot IM_t^C \quad (21)$$

subject to the technology constraint (20) taking intermediate goods prices as given.

The price index that results from solving this problem is:<sup>2</sup>

$$P_{C,t} = (\Omega_t^C)^{1-\mu_C} (\lambda_t^C)^{\mu_C} \quad (22)$$

where:

$$\lambda_t^C = \left[ \nu_C P_{H,t}^{1-\mu_C} + (1-\nu_C) (P_{IM,t} / \Gamma_{IM^C}(IM_t^C / Q_t^C))^{1-\mu_C} \right]^{\frac{1}{1-\mu_C}} \quad (23)$$

$$\Omega_t^C = \left\{ \nu_C (P_{H,t})^{1-\mu_C} + (1-\nu_C) \left( \frac{\Gamma_{IM^C}(IM_t^C / Q_t^C)}{(1-\Gamma_{IM^C}(IM_t^C / Q_t^C))} \right) \right\}^{\frac{1}{1-\mu_C}} \times (P_{IM,t} / \Gamma_{IM^C}(IM_t^C / Q_t^C))^{1-\mu_C} \quad (24)$$

In CMS, the multiplier  $\lambda_t^C$  is assumed to be the price index for one unit of the consumption good. However, this result is not compatible with their assumption that final goods firms operate with zero profits.

Notice that only when  $\Omega_t^C = \lambda_t^C$  do we obtain  $P_{C,t} = \lambda_t^C = \Omega_t^C$ . This requires

$$\left( \frac{\Gamma_{IM^C}(IM_t^C / Q_t^C)}{(1-\Gamma_{IM^C}(IM_t^C / Q_t^C))} \right) = 1, \text{ a very specific case.}$$

In general, when this equality does not hold, first order conditions and equation (22) can be combined to yield the following demand equations:

<sup>2</sup> Details of the derivation of (22) are shown in Appendix D.

$$H_t^C = \nu_C \left( \frac{P_{H,t}}{\Omega_t^C} \right)^{1-\mu_C} \left( \frac{P_{H,t}}{P_{C,t}} \right)^{-\mu_C} Q_t^C \quad (25)$$

$$IM_t^C = (1-\nu_C) \left( \frac{P_{C,t}}{\Omega_t^C} \right)^{1-\mu_C} \left( \frac{P_{IM,t} / \Gamma_{IM^C}^S (IM_t^C / Q_t^C)}{P_{C,t}} \right)^{-\mu_C} \frac{Q_t^C}{1-\Gamma_{IM^C} (IM_t^C / Q_t^C)} \quad (26)$$

These demand equations are different from the ones in CMS, and, as we show in subsequent sessions, they also result in important differences in the market clearing equations. In particular, the equation for the aggregate resource constraint of the economy now resembles the usual representation of national accounts.

### 2.2.2.b Investment goods

The pricing problem of investment goods is analogous to that of consumer goods. The investment goods price index, which also differs from CMS, is:

$$P_{I,t} = (\Omega_t^I)^{1-\mu_I} (\lambda_t^I)^{\mu_I} \quad (27)$$

where:

$$\Omega_t^I = \left\{ \nu_I (P_{H,t})^{1-\mu_I} + (1-\nu_I) \left( \frac{\Gamma_{IM^I}^S (IM_t^I / Q_t^I)}{(1-\Gamma_{IM^I} (IM_t^I / Q_t^I))} \right) \right\}^{\frac{1}{1-\mu_I}} \times \left( P_{IM,t} / \Gamma_{IM^I}^S (IM_t^I / Q_t^I) \right)^{1-\mu_I} \quad (28)$$

and:

$$\lambda_t^I = \left[ \nu_I P_{H,t}^{1-\mu_I} + (1-\nu_I) (P_{IM,t} / \Gamma_{IM^I}^S (IM_t^I / Q_t^I))^{1-\mu_I} \right]^{\frac{1}{1-\mu_I}} \quad (29)$$

## 2.3 Fiscal authorities

The domestic fiscal authority pursues a primary surplus target ( $sp$ ), levies taxes on consumption, labor, capital and dividends, makes biased transfers, and adjusts expenditures and budget financing accordingly.

The primary surplus  $SP_t$  is defined as:

$$\begin{aligned} SP_t = & \tau_t^C P_{C,t} C_t + (\tau_t^N + \tau_t^{W_h} + \tau_t^{W_f}) W_t \cdot N_t^D \\ & + \tau_t^K (R_{H,t} u_{I,t} - (\Gamma_u(u_{I,t}) + \delta) \cdot P_{I,t}) K_{H,t} + \tau_t^D \cdot D_t \\ & + u_{I,t} \cdot R_{G,t} \cdot K_{G,t} - P_{G,t} G_t - TR_t - P_{I,t} \cdot I_{G,t} \end{aligned} \quad (30)$$

where  $\tau_t^C$ ,  $\tau_t^N$ ,  $\tau_t^{W_h}$ ,  $\tau_t^{W_f}$ ,  $\tau_t^K$ , and  $\tau_t^D$  are rates of taxes levied on consumption, labor income, social security from workers, social security from firms, capital and dividends.  $P_{G,t} G_t$  stands for aggregate expenditures with government consumption,  $TR_t$  stands for government transfers, and  $P_{I,t} \cdot I_{G,t}$  stands for aggregate expenditures with government investment.

Table 1

## Empirical Estimate of the Primary Surplus Rule in Brazil

Dependent Variable: PRI_SUR_PIB_SA					
Method: Least Squares					
Sample (adjusted): 1996Q3 2009Q1					
Included observations: 51 after adjustments					
Convergence achieved after 1 iteration					
PRI_SUR_PIB_SA = C(2)*PRI_SUR_PIB_SA(-1) + C(4)*PRI_SUR_PIB_SA(-2)					
+ (1-C(2) - C(4))*(C(1) + C(3)*(DLSP_PIB_SA(-1)-2.1214))					
+ C(5)*(PIB_TRIM_SA(-1)/100 - 0.004962932)					
Variable		Coefficient	Std. Error	t-statistic	Prob.
C(2)	$\rho_1$	0.248161	0.094789	2.618042	0.0119
C(4)	$\rho_2$	0.167091	0.083178	2.008836	0.0504
C(1)	$sp$	0.041899	0.004038	10.37669	0.0000
C(3)	$\phi_b$	0.040928	0.012266	3.336770	0.0017
C(5)	$\phi_{gy}$	<b>0.269544</b>	0.107748	2.501619	<b>0.0160</b>
R-squared		0.710078			
Adjusted R-squared		0.684868			

The realization of the primary surplus is affected by deviations of the public debt and economic growth from their steady-states ( $B_y$  and  $g_y$ , respectively):

$$sp_t = \rho_{1,sp} \cdot sp_{t-1} + \rho_{2,sp} \cdot sp_{t-2} + (1 - \rho_{1,sp} - \rho_{2,sp}) \cdot \{sp + \phi_{B_y} (b_{Y,t} - b_Y)\} + \phi_{g_y} (g_{Y,t-1} - g_Y) + \varepsilon_{sp,t} \quad (31)$$

where  $sp_t = \frac{SP_t}{P_{Y,t} \cdot Y_t}$ ,  $b_{Y,t} = \frac{B_t}{P_{Y,t-1} Y_{t-1}}$ ,  $g_{Y,t} = \frac{Y_t}{Y_{t-1}}$ , the unindexed counterparts are steady-state ratios, and  $\varepsilon_{sp,t}$  is a white noise shock to the primary surplus.

For industrialized economies, Cecchetti *et al.* (2010) do not find evidence of a response of the primary balance to economic conditions. For Brazil, our empirical estimates for the primary balance rule show a significant anti-cyclic component (Table 1), which is also addressed, yet in a different manner, in Ratto *et al.* (2009). Estimations of the rule with only one lag in the primary balance do not show well-behaved residuals.

In our calibrations, the foreign economy is represented by the USA and the Euro area. Therefore, for the foreign economy, we adopt CMS's assumption that the fiscal authority does not follow a primary surplus target, and government expenditures with consumption,

$g_t = \left( \frac{P_{G,t}}{P_{Y,t}} \right) \left( \frac{G_t}{Y_t} \right)$ , follow an autoregressive process:

$$g_t = (1 - \rho_g) \cdot g + \rho_g \cdot g_{t-1} + \varepsilon_{g,t} \quad (32)$$

where  $g$  is the steady state value of government expenditures as a share of GDP and  $\varepsilon_{g,t}$  is a white noise shock to government expenditures. Specifically for the foreign economy, we assume that lump sum taxes exist and follow an autoregressive process of the type:

$$\left( \frac{T_t}{P_{Y,t} \cdot Y_t} \right) := \phi_{B_Y} \left( \left( \frac{R_t^{-1} \cdot B_{t+1}}{P_{Y,t} \cdot Y_t} \right) - B_Y \right) \quad (33)$$

where  $B_Y$  is the steady state value of government bonds.

For both economies, government transfers follow the autoregressive process:

$$\left( \frac{TR_t}{P_{Y,t} \cdot Y_t} \right) = (1 - \rho_{tr}) \cdot tr + \rho_{tr} \cdot \left( \frac{TR_t}{P_{Y,t} \cdot Y_t} \right) + \varepsilon_{tr,t} \quad (34)$$

where  $tr$  is the steady state value of government transfers, and  $\varepsilon_{tr,t}$  represents a white noise shock to government transfers.

Total transfers are distributed to each household group according to:

$$TR_{I,t} := \frac{(1 - \omega \cdot v_{tr})}{1 - \omega} TR_t \quad (35)$$

$$TR_{J,t} := v_{tr} \cdot TR_t \quad (36)$$

where  $v_{tr}$  is the bias in transfers towards group  $J$ .

Government investment follows an autoregressive rule of the form:

$$ig_t = (1 - \rho_{ig}) ig + \rho_{ig} \cdot ig_{t-1} + \varepsilon_{ig,t} \quad (37)$$

and public capital accumulation follows the rule:

$$K_{G,t+1} = (1 - \delta) \cdot K_{G,t} + \left( 1 - \Gamma_I \left( \frac{I_{G,t}}{I_{G,t-1}} \right) \right) I_{G,t} \quad (38)$$

The government budget constraint is thus:

$$\begin{aligned} & \tau_t^C P_{C,t} C_t + (\tau_t^N + \tau_t^{W_h} + \tau_t^{W_f}) \cdot W_t \cdot N_t^D \\ & + \tau_t^K (R_{K,t} \cdot u_{I,t} - (\Gamma_u(u_{I,t}) + \delta) \cdot P_{I,t}) \cdot K_t \\ & + \tau_t^D \cdot D_t + T_t + R_t^{-1} \cdot B_{t+1} + M_t + u_{I,t} \cdot R_{G,t} \cdot K_{G,t} \\ & - P_{G,t} G_t - TR_t - B_t - M_{t-1} - P_{I,t} \cdot I_{G,t} = 0 \end{aligned} \quad (39)$$

with  $T_t = 0$  for the domestic economy, which, using the primary surplus definition, can be stated as:

$$SP_t = (B_t - R_t^{-1} \cdot B_{t+1}) - (M_t - M_{t-1}) \quad (39)'$$

This equation makes clear that, in this model, money not only has an effective role in real decisions, but also matters for the adjustment of fiscal accounts. Increased money supply can alleviate the financial burden from public debt, a feature that approximates the theoretical model to the real conduct of economic policy.

## 2.4 Monetary authorities

The domestic monetary authority follows a forward-looking interest rate rule that is compatible with an inflation targeting regime:

$$R_t^4 = \phi_{R1} \cdot R_{t-1}^4 + \phi_{R2} \cdot R_{t-2}^4 + (1 - \phi_{R1} - \phi_{R2}) \cdot \left[ R^4 + \phi_{\Pi} \left( \frac{P_{C,t+3}}{P_{C,t-1}} - \Pi \right) \right] + \phi_{g_Y} (g_{Y,t-1} - g_Y) + \varepsilon_{R,t} \quad (40)$$

where  $\Pi$  is the annual inflation target,  $R^4$  is the annualized quarterly nominal equilibrium interest rate, which satisfies  $R^4 = \beta^{-4} \cdot \Pi$ ,  $g_Y$  is the steady state output growth rate, and  $\varepsilon_{R,t}$  is a white noise shock to the interest rate rule. Empirical evidence in Brazil suggests the presence of two lags in the policy instrument.<sup>3</sup>

For the foreign economy we adopt the representation in CMS:

$$R_t^4 = \phi_R \cdot R_{t-1}^4 + (1 - \phi_R) \cdot \left[ R^4 + \phi_{\Pi} \left( \frac{P_{C,t}}{P_{C,t-3}} - \Pi_t \right) \right] + \phi_{g_Y} \left( \frac{Y_t}{Y_{t-1}} - g_Y \right) + \varepsilon_{R,t} \quad (41)$$

## 2.5 Aggregation and market clearing

Any aggregated model variable  $Z_t$  denoted in per capita terms results from the aggregation

$$Z_t := \int_0^1 Z_{h,t} dh = (1 - \omega) \cdot Z_{I,t} + \omega \cdot Z_{J,t} \text{ where } Z_{I,t} \text{ and } Z_{J,t} \text{ are the respective per capita values of } Z_t \text{ for families } I \text{ and } J. \text{ Details on the aggregation that do not substantially differ from CMS are not shown.}$$

There are important distinctions in the aggregate relations that obtain from this model as compared to those in CMS. The first refers to the wage dispersion index, and the second to the economy's resource constraint, which are detailed below.

### 2.5.1 Wage dispersion

The equilibrium conditions between supply ( $N_{i,t}$ ) and demand ( $N_t^i$ ) for individual labor are:

$$N_{i,t} = N_t^i := \int_0^1 N_{f,t}^i df \quad (42)$$

$$N_{j,t} = N_t^j := \int_0^1 N_{f,t}^j df \quad (43)$$

Aggregating the demand of all firms for labor services yields:

<sup>3</sup> See Minella and Souza-Sobrinho (2009).

$$N_{i,t} = \frac{1}{1-\omega} \left( \frac{W_{i,t}}{W_{I,t}} \right)^{-\eta_I} N_t^I \quad (44)$$

$$N_{j,t} = \frac{1}{\omega} \left( \frac{W_{j,t}}{W_{J,t}} \right)^{-\eta_J} N_t^J \quad (45)$$

which can also be represented, using the group-wise aggregated labor demand equations, as a function of total demand for labor by the intermediate firms:

$$N_{i,t} = \frac{1-\nu_\omega \cdot \omega}{1-\omega} \left( \frac{W_{i,t}}{W_{I,t}} \right)^{-\eta_I} \left( \frac{W_{I,t}}{W_t} \right)^{-\eta} \cdot N_t^D \quad (46)$$

$$N_{j,t} = \nu_\omega \left( \frac{W_{j,t}}{W_{J,t}} \right)^{-\eta_J} \left( \frac{W_{J,t}}{W_t} \right)^{-\eta} \cdot N_t^D \quad (47)$$

The aggregate supply of labor from each household group,  $N_{i,t}$  and  $N_{j,t}$ , relates to the labor demand as:

$$N_{I,t} := \frac{1}{1-\omega} \int_0^{1-\omega} N_{i,t} di = \frac{\psi_{I,t}}{1-\omega} \cdot N_t^I \quad (48)$$

$$N_{J,t} := \frac{1}{\omega} \int_{1-\omega}^1 N_{j,t} dj = \frac{\psi_{J,t}}{\omega} \cdot N_t^J \quad (49)$$

where  $\psi_{I,t} := \int_0^{1-\omega} \frac{1}{1-\omega} \left( \frac{W_{i,t}}{W_{I,t}} \right)^{-\eta_I} di$  and  $\psi_{J,t} := \int_{1-\omega}^1 \frac{1}{\omega} \left( \frac{W_{j,t}}{W_{J,t}} \right)^{-\eta_J} dj$  are the dispersion indices.

We show in Appendix E that the wage dispersion indices  $\psi_{I,t}$  and  $\psi_{J,t}$  can be stated in a recursive formulation that differs from the working paper version of CMS as to the term of current consumer-price inflation that does not show in our equation:<sup>4</sup>

$$\psi_{I,t} := (1-\xi_I) \cdot \left( \frac{\tilde{W}_{I,t}}{W_{I,t}} \right)^{-\eta_I} + \xi_I \cdot \left( \frac{\pi_{C,t-1}^{\chi_I} \pi_C^{1-\chi_I}}{\pi_{W_{I,t}}} \right)^{-\eta_I} \cdot \psi_{I,t-1} \quad (50)$$

$$\psi_{J,t} := (1-\xi_J) \cdot \left( \left( \frac{\tilde{W}_{J,t}}{P_{Y,t} \cdot Y_t} \right) \left( \frac{W_{J,t}}{P_{Y,t} \cdot Y_t} \right)^{-1} \right)^{-\eta_J} + \xi_J \cdot \left( \frac{\pi_{C,t-1}^{\chi_J} \pi_C^{1-\chi_J}}{\pi_{W_{J,t}}} \right)^{-\eta_J} \cdot \psi_{J,t-1} \quad (51)$$

where  $\pi_{W_{I,t}}$  and  $\pi_{W_{J,t}}$  stand for household  $I$  and  $J$  wage inflation rates.

Aggregating the labor supply from household groups  $I$  and  $J$ , using equations (48) and (49), results in:

$$N_{S,t} := \psi_{I,t} \cdot N_t^I + \psi_{J,t} \cdot N_t^J$$

<sup>4</sup> Equation A.9, WPS 747/ECB.

which relates to the aggregate labor demand and the total wage dispersion index as:

$$N_{S,t} = \psi_t \cdot N_t^D \quad (52)$$

where total wage dispersion is  $\psi_t := \left\{ (1 - \omega) \cdot \left( \frac{W_{I,t}}{W_t} \right)^{-\eta} \psi_{I,t} + \omega \cdot \left( \frac{W_{J,t}}{W_t} \right)^{-\eta} \psi_{J,t} \right\}$ .

### 2.5.2 Aggregate resource constraint

The price indices derived in the previous sessions entail representations for the aggregate resource constraint of the economy that are importantly different from the ones presented in CMS and CCW. Aggregating household and government budget constraints, and substituting for the equations of external financing and optimality conditions of firms, we obtain the aggregate resource constraint of the economy:

$$P_{Y,t} \cdot Y_t = P_{C,t} \cdot Q_t^C + P_{I,t} \cdot Q_t^I + P_{G,t} \cdot Q_t^G + S_t \cdot P_{X,t} \cdot X_t - P_{IM,t} \cdot IM_t \quad (53)$$

which, using the price indices derived above, can also be restated as:

$$P_{Y,t} \cdot Y_t = P_{H,t} \cdot H_t^C + P_{H,t} \cdot H_t^I + P_{H,t} \cdot H_t^G + S_t \cdot P_{X,t} \cdot X_t \quad (54)$$

Despite the fact that these representations are standard for national accounts, they differ from the respective equations derived in CMS<sup>5</sup> and CCW, as we detail in Appendix F.

## 3 Model transformation and steady state calibration

In this section we describe the transformation of variables that render the model stationary, and detail the steady state calibration.

As we assume a technology shock that permanently shifts the productivity of labor, all real variables, with the exception of hours worked, share a common stochastic trend. Besides, as the monetary authority aims at stabilizing inflation, rather than the price level, all nominal variables share a nominal stochastic trend.

The strategy consists of three main types of transformation. Real variables are divided by aggregate output ( $Y_t$ ), nominal variables are divided by the price of aggregate output ( $P_{Y,t}$ ) and the variables expressed in monetary terms are divided by  $P_{Y,t} \cdot Y_t$ .

Although most transformations are straightforward, some are not trivial. Predetermined variables, such as capital, are scaled by dividing their lead values by  $Y_t$ ; wages, domestic bonds, and internationally traded bonds are scaled by  $P_{Y,t} \cdot Y_t$ . In addition, in order to make the Lagrange multipliers compatible with the adopted scaling strategy, we multiply them by  $Y_t^\sigma$ , resulting in  $Y_t^\sigma \cdot \Lambda_{I,t}$  and  $Y_t^\sigma \cdot \Lambda_{J,t}$  for households  $I$  and  $J$ , respectively.

<sup>5</sup> Equation (38) in CMS.



Table 2

## Steady State Ratios

Ratio	Value		Description
	Brazil	Rest of the World	
$TB/P_Y Y$	0.012	0.00	Trade balance
$X/Y$	0.128	0.00	Exports
$IM/Y$	0.122	0.00	Imports
$M/P_Y Y$	0.205	1.24	Money
$ROG/P_Y Y$	0.000	0.0	Government budget
$P_I I_G/P_Y Y$	0.019	0.02	Government investment
$T/P_Y Y$	0.000	0.00	Lump-sum taxes
$B/P_Y Y$	2.121	2.79	Public Debt
$SP/P_Y Y$	0.036	-0.005	Primary Surplus
$D/P_Y Y$	0.0	0.0	Dividends
$P_I I_H/P_Y Y$	0.162	0.25	Private Investment

The permanent technology shock,  $zn_t$ , should also be divided by the aggregate output. Re-scaling the production function for the intermediate goods results in:

$$\left(\frac{zn_t}{Y_t}\right)^{-1} = z_t \cdot \left(u_{I,t} \cdot \frac{K_t}{Y_{t-1}}\right)^\alpha \cdot (N_t^D)^{1-\alpha} \cdot \left(\frac{Y_t}{Y_{t-1}}\right)^{-\alpha} \cdot \left(\frac{zn_t}{Y_t}\right)^{-\alpha} - \psi$$

From the above, we can conclude that  $\frac{zn_t}{Y_t}$  is a stationary variable whenever the ratios  $\frac{K_t}{Y_{t-1}}$  and

$\frac{Y_t}{Y_{t-1}}$  are both stationary.

We now turn to the steady state calibration. For the domestic economy, we calibrate the model to reproduce historical averages of the Brazilian economy during the inflation targeting regime (Table 2). For parameters that are not directly derived from the historical averages in these series, we took the agnostic stance of using the same parameters adopted in the literature for Brazil, or, in its absence, we replicated the parameters in CMS.<sup>6</sup> The rest of the world is calibrated using an average of the values presented in CMS for the United States and the Euro Area.

Calibration and simulations are performed under the assumption of log-linear utility ( $\sigma = 1$ ). The steady state calibration starts by normalizing the stationary prices of intermediate goods at 1.

<sup>6</sup> An alternative strategy would be to calibrate the parameters to reproduce empirical moments of the endogenous series. We leave this for a companion paper with an estimated version of the model.

This normalization ensures that the steady state values of some variables are one, as is the case of final goods prices and Lagrange multipliers associated with the optimization problem of final goods firms. The steady state rate of capital utilization is also fixed at one for both economies. The remaining steady state ratios are calibrated accordingly, as shown in Table 3.

We calibrate the population size using LABORSTA<sup>7</sup> data on the economically active population in the world for the year 2007. The size of household's group  $J$  in the domestic economy was set to equal the share of households in Brazil that earn less than two minimum wages according to the PNAD 2007 survey. Also according to this survey, relative wages for household group  $I$  were set in our calibrations at 2.86.

The share of fixed costs in total production was set so as to guarantee zero profits in the steady state. The labor demand bias,  $\nu_\omega$ , was calibrated to ensure that households' groups  $I$  and  $J$  work the same amount of hours. For the stationary labor productivity growth rate, we set 2 per cent for Brazil and the rest of the world using data on GDP growth from the World Bank for the period 2000-07.

For Brazil, we calibrated the price elasticity  $\mu_C = 0.33$  according to Araújo *et al.* (2006). For the price elasticity  $\mu_I$ , we repeated the value set for  $\mu_C$ . The home biases  $\nu_C$  and  $\nu_I$  are obtained from the demand equations of imported goods using the steady state value for the supply of consumption and investment goods, and the import quantum.

The steady state primary surplus to output ratio,  $sp$ , was calibrated as the mean value of the primary surplus in the period 1999-2008. For the rest of the world, the value for  $sp$  was obtained implicitly from the NAWM calibration. The public debt ratio  $B_Y$  was set to be consistent with  $sp$ .

Government expenditures,  $g$ , for both Brazil and the rest of the world were set residually from the aggregate resource constraint. Government transfers,  $tr$ , for both Brazil and the rest of the world, were obtained so that household budget constraints close.

With the exception of consumption taxes,  $\tau^C$ , which were calibrated following Siqueira *et al.* (2001), Brazilian tax rates were calibrated based on the current tax law. The lump-sum tax bias,  $\nu_{tp}$ , which is active only for the foreign economy, was set to one, whilst the transfer bias,  $\nu_{tr}$ , was implicitly calculated from households  $I$  and  $J$  budget constraints.

We calibrated the price-elasticity to demand of government investment goods,  $\eta_g$ , to a value that is close to 1, arbitrarily approximating it to a Cobb-Douglas technology. This enabled us to calibrate  $\nu_g$  from the rental rate on government capital, which we assumed to be just enough to cover expenditures with depreciation.

The inflation target and the respective steady state nominal interest rate in the domestic economy were set according to historical Brazilian averages. The reaction coefficients in the monetary policy rule were calibrated according to Minella and Souza-Sobrinho (2009), where they show that the monetary policy in Brazil has in average shown an insignificant direct reaction to output.

The parameter  $\gamma_{v,2}$  that appears in the functional form of the consumption transaction for the domestic economy was set at the same value calibrated in CMS. The parameter  $\gamma_{v,1}$  follows from

<sup>7</sup> <http://laborsta.ilo.org/>

Table 3

## Calibrated Parameters and Steady State Variables

Parameter	Value		Description
	Brazil	Rest of the World	
A) Households			
$S$	0.00478	0.99522	Population size
$\beta$	0.98183	0.99756	Subjective discount factor
$\sigma$	1.00000	1.00000	Inverse of the intertemporal elasticity of substitution
$\kappa$	0.23280†	0.60000	Degree of habit persistence
$\zeta$	1.59000‡	2.00000	Inverse of the Frisch elasticity of labor supply
$\delta$	0.02500	0.02500	Depreciation rate
$\omega$	0.59260	0.25000	Size of household $J$
$\xi_I, \xi_J,$	0.48660†	0.75000	Fraction of household members not setting wages optimally each quarter
$\chi_I, \chi_J$	0.75000	0.75000	Degree of wage indexation for household members
B) Intermediate-good firms			
$\alpha$	0.30000	0.30000	Share of capital income in value added
$\psi$	0.14909	0.41200	Share of fixed cost in production
$z$	1.00000	1.00000	Stationary total productivity level
$\rho_z$	0.89000‡	0.90000	Productivity parameter
$\eta$	6.00000	6.00000	Price elasticity of demand for labor bundles
$\eta_I$	6.00000	6.00000	Price elasticity of demand for labor of household $I$
$\eta_J$	6.00000	6.00000	Price elasticity of demand for labor of household $J$
$\xi_H$	0.90000	0.90000	Fractions of firms not setting prices optimally each quarter
$\xi_X$	0.30000	0.30000	Fractions of firms not setting prices optimally each quarter
$\chi_H, \chi_X$	0.50000	0.50000	Degree of price indexation
$\theta_T$	1.00500	1.00500	Stationary labour productivity growth rate
$\rho_{zn}$	0.90000	0.90000	Labor productivity parameter
$v_\omega$	0.00438	1.00000	Labor demand bias

Table 3 (continued)

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## Calibrated Parameters and Steady State Variables

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Parameter	Value		Description
	Brazil	Rest of the World	
C) Final-good firms			
$u_C$	0.87500	0.99650	Home bias in the production of consumption final goods
$u_I$	0.74999	1.00750	Home bias in the production of investment final goods
$\mu_C, \mu_I$	3.33000	1.50000	Price elasticity of demand for intermediate-goods
$\theta$	7.60000‡	6.00000	Price elasticity of demand for a specific intermediate-good variety
D) Fiscal authority			
$B_F$	2.12140	2.78840	Government debt as a share of quarterly GDP in the steady state
$\phi_{BY}$	0.0409	0.10000	Primary surplus reaction to debt-to-output in the domestic economy and sensitivity of lump-sum taxes to debt-to-output ratio in the foreign economy
$\phi_{BY}$	0.2695	n/a	Primary surplus reaction to output growth
$g$	0.1992	0.11099	Government consumption of public goods in the steady state
$\rho_g$	n/a	0.90000	Parameter governing public consumption
$tr$	0.1526	0.29231	Public transfers-to-GDP in steady state
$\rho_{tr}$	0.37717	0.90000	Parameter governing public transfers
$\tau^C$	0.16200	0.18300	Consumption tax rate
$\tau^D$	0.15000	0.00000	Dividend tax rate
$\tau^K$	0.15000	0.18400	Capital income tax rate
$\tau^N$	0.15000	0.14000	Labour income tax rate
$\tau^{W_h}$	0.11000	0.11800	Rate of social security contributions by households
$\tau^{W_f}$	0.20000	0.21900	Rate of social security contributions by firms
$sp$	0.03600	(0.00541)	Stationary primary surplus to output ratio
$\rho_{1,sp}$	0.2481	0.90000	Parameter of the first autoregressive term in the primary surplus rule
$\rho_{2,sp}$	0.1671	n/a	Parameter of the second autoregressive term in the primary surplus rule
$u_{tr}$	1.01300	0.42668	Household J transfers bias
$\eta_{tr}$	1.00000	1.00000	Household J lump-sum tax bias
$u_g$	0.05198	0.05590	Government investment bias
$\eta_g$	1.00100	1.00100	Elasticity of substitution between government and private investment goods
$lg$	0.01860	0.02000	Government investment-to-output ratio target
$\rho_{lg}$	0.90000	0.90000	Parameter governing government investment-to-output ratio

Table 3 (continued)

## Calibrated Parameters and Steady State Variables

Parameter	Value		Description
	Brazil	Rest of the World	
E) Monetary Authority			
$\Pi$	1.04500	1.02000	Inflation target
$\phi_{R1}$	1.13‡	0.95000	Degree of interest-rate inertia
$\phi_{R2}$	−0.51‡	0.00000	Degree of interest-rate inertia
$\phi_{\Pi}$	1.57000‡	2.00000	Interest-rate sensitivity to inflation gap
$\phi_{gY}$	0‡	0.10000	Interest-rate sensitivity to output-growth gap
$R$	1.03490	1.01240	Equilibrium nominal interest-rate
$\pi_H$	1.01110	1.00500	Steady state domestic prices inflation
$\pi_X$	1.00500	1.01110	Steady state export prices inflation
$\pi_C$	1.01110	1.00500	Steady state consumption prices inflation
F) Adjustment and transaction costs			
$\gamma_{wA}$	0.01545	0.47073	Parameter of transaction cost function
$\gamma_{wB}$	0.15000	0.15000	Parameter of transaction cost function
$\gamma_{uA}$	0.05271	0.03409	Parameter of capital utilization cost function
$\gamma_{uB}$	0.00700	0.00700	Parameter of capital utilization cost function
$\gamma_I$	3.00000	3.00000	Parameter of investment adjustment cost function
$\gamma_{IM^C}$	2.50000	2.50000	Parameter of import adjustment cost function
$\gamma_{IM^F}$	0.00000	0.00000	Parameter of import adjustment cost function
$\gamma_{BF}$	0.01000	0.01000	Parameter of intermediation cost function

Notes: Areosa, Areosa and Lago (2006): †, Minella and Souza-Sobrinho (2009): ‡

the equation that defines the consumption transaction cost, the calibrated values for money and consumption, and the equation that defines the money velocity. Finally, some autoregressive coefficients ( $\rho_{zn}, \rho_{sp}, \rho_{ig}$ ) were set at 0.9 following the NAWM calibration for  $\rho_z$ . For autoregressive coefficients referring to government consumption and transfers,  $\rho_g$  and  $\rho_{tr}$ , we used estimated coefficients obtained from isolated econometric regressions for Brazil.

#### 4 Simulations and policy analysis

In this session, we show impulse responses for shocks to: monetary policy, primary surplus, government transfers and investment.<sup>8</sup> The intention here is to understand how this model responds to shocks under the adopted calibration. We compare the model's predictions for alternative types of primary surplus and monetary policy rules. All simulations were done using the function "stoch\_simul" of DYNARE at MATLAB.

##### 4.1 Impulse responses of the calibrated model

Figure 1 shows the impulse responses of a 1 percentage point shock to the nominal interest rate. With this calibration, the shock affects inflation and output in the expected direction, but we do not obtain a hump-shaped response.<sup>9</sup> The trough in inflation and output growth occurs already in the first quarter. Inflation reverts back to the steady state in the third quarter, while the nominal interest rate remains above the steady state for about one year. Output levels return to the steady state in about 6 quarters.

Despite the fact that each policy rule responds to a different set of variables, in equilibrium the fiscal response intertwines with monetary conditions, the key linking element being the public debt. The interest rate hike puts pressure on the public debt, which rises above its steady trend and takes very long to revert to the steady state. Notwithstanding, the anti-cyclic component of the fiscal rule forces the primary surplus to initially react to the economic downturn, and the fiscal rule loosens through a reduction in the primary surplus of about 0.05 percentage points of GDP from its steady state. This reaction is enabled by an increase in government consumption that should also offset the reduction in expenditures with government investment. In the third quarter, public debt to GDP reaches a peak, and the output growth surpasses its stationary rate. This development puts pressure on the fiscal rule for a rise in the primary surplus of up to 0.10 percentage points of GDP, through a reduction in government consumption and levels of government investment below the steady state for longer than private investment. Consequently, the debt initiates a downward path, yet still above its steady state for a long time afterwards.

The economy decelerates in the aftermath of a monetary policy shock. Capital utilization is below the steady state and firms pay lower nominal wages to households. The amount of labor and consumption also drops. The impact on private investment and the stock of capital is almost negligible. The distributional effects, although very small, are less favorable to less specialized and more constrained households.

The dynamics of endogenous variables after the shock affects GDP composition. Although private consumption to GDP falls in the first quarter, it immediately bounces upwards after the second quarter mostly to replace investment and public consumption.

<sup>8</sup> The standard deviations of all shocks were arbitrarily set at 100bps. Their values are not meant to reflect their empirical counterpart.

<sup>9</sup> Minella (2003) and Silveira (2008) also report impulse responses of inflation and output after a monetary policy shock that lack the "hump shapeness" that is observed in other countries.

Figure 1

## Impulse Responses to a Contractionist Shock to Monetary Policy

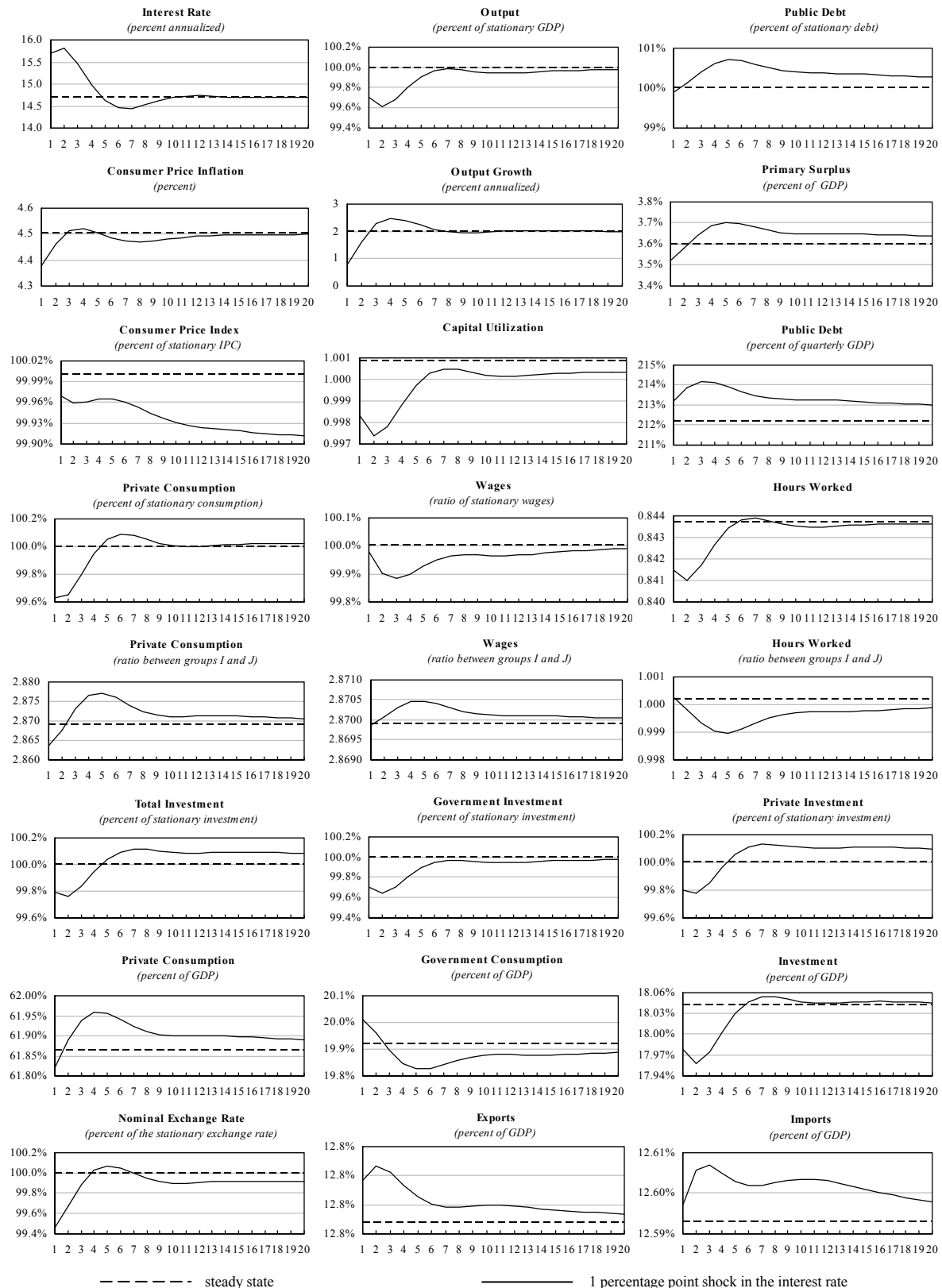


Figure 2 shows the impulse responses of a 1 percentage point reduction in the primary surplus. The shock initially increases government consumption by about 0.4 percentage points of GDP and raises public investment by 1 per cent from its steady state. Such expansionist effect initially boosts output growth to around 7 per cent per year, but in the second quarter, output growth falls to levels below steady state, where it reverts to afterwards. This shock has a smaller impact on the levels of private consumption and labor as compared to their steady state trends. The monetary effects of the fiscal shock comprise an increase of up to 0.2 percentage points in consumer price inflation, and, in spite of the contractionist stance of monetary policy, inflation remains above its steady state for a prolonged period.

The shape of the responses of inflation and public debt varies according to which shock is activated. For each shock, there is a distinct transmission mechanism. When the shock comes from the monetary policy, the response of the debt is more hump-shaped as the fiscal rule reacts to economic conditions. On the other hand, when the shock stems from the fiscal sector, the response of inflation becomes more hump-shaped, as the monetary policy rule reacts to the inflationary conditions imposed by the fiscal loosening.

To account for the fact that transfers are usually an instrument used for income distribution, the shock to government transfers (Figure 3) is biased towards less specialized and more constrained households. The hike in government transfers is enabled by a reduction in government consumption and public investment. These choices of cuts in government expenditures initially result in a significant downturn in economic activity. The fall in private consumption that could follow from depressed conditions stemming from the production side of the model does not occur possibly because of the direct injection of financial resources to households by the transfers (income effect) and also because monetary policy reacts to poor economic conditions and to the drop in inflation by keeping interest rates slightly below the steady state. Net public expenditures that result from the shock to transfers are not financed through debt issuance above steady state trends. In addition, the distributional effect of the shock vanishes after about 5 quarters.

A shock to government investment (Figure 4), of about 1 percentage point of GDP, crowds out private investment, as the rental rate of public capital is cheaper in the steady state. The rise in expenditures with public investment is financed through cuts in government consumption, driving the primary surplus down to levels below the steady state, and through debt issuance. Afterwards, the rise in public debt exerts a contractionist pressure on the fiscal rule, and the primary surplus rises after the third quarter. The initial inflationary spike results in a contractionist monetary policy reaction, and the final outcome is a drop in economic dynamism, with output below its steady state path for about 5 quarters. After the third quarter, the shock to government investment boosts output growth to above its steady state for a very prolonged time span. After the contractionist stance imposed by the fiscal and monetary adjustment unwinds, private consumption and wages rise a little above the steady state and remain there for a long time.

## 4.2 Policy analysis

To understand how the interaction of fiscal and monetary policy affects the model's predictions, we analyze impulse responses, variances and variance decompositions after policy shocks under a number of different specifications for the policy rules.

### 4.2.1 Sensitivity analysis

Figure 5 shows the impulse responses of a monetary policy shock with varying degrees of fiscal commitment with the stationary path of public debt. Greater commitment to the debt-to-GDP



Figure 2

## Impulse Responses to an Expansionist Shock to the Primary Surplus

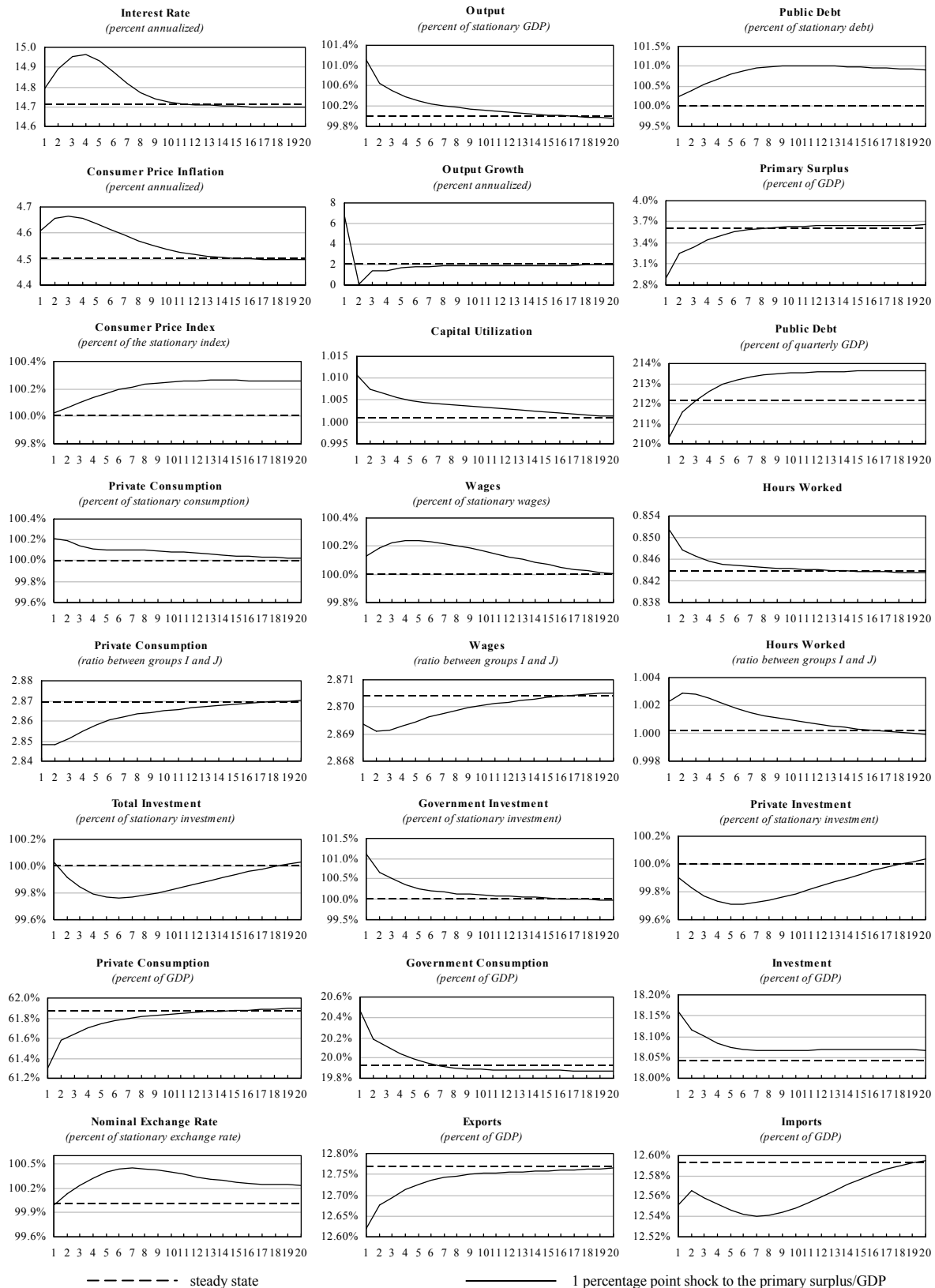


Figure 3

### Impulse Responses to a Shock to Government Transfers

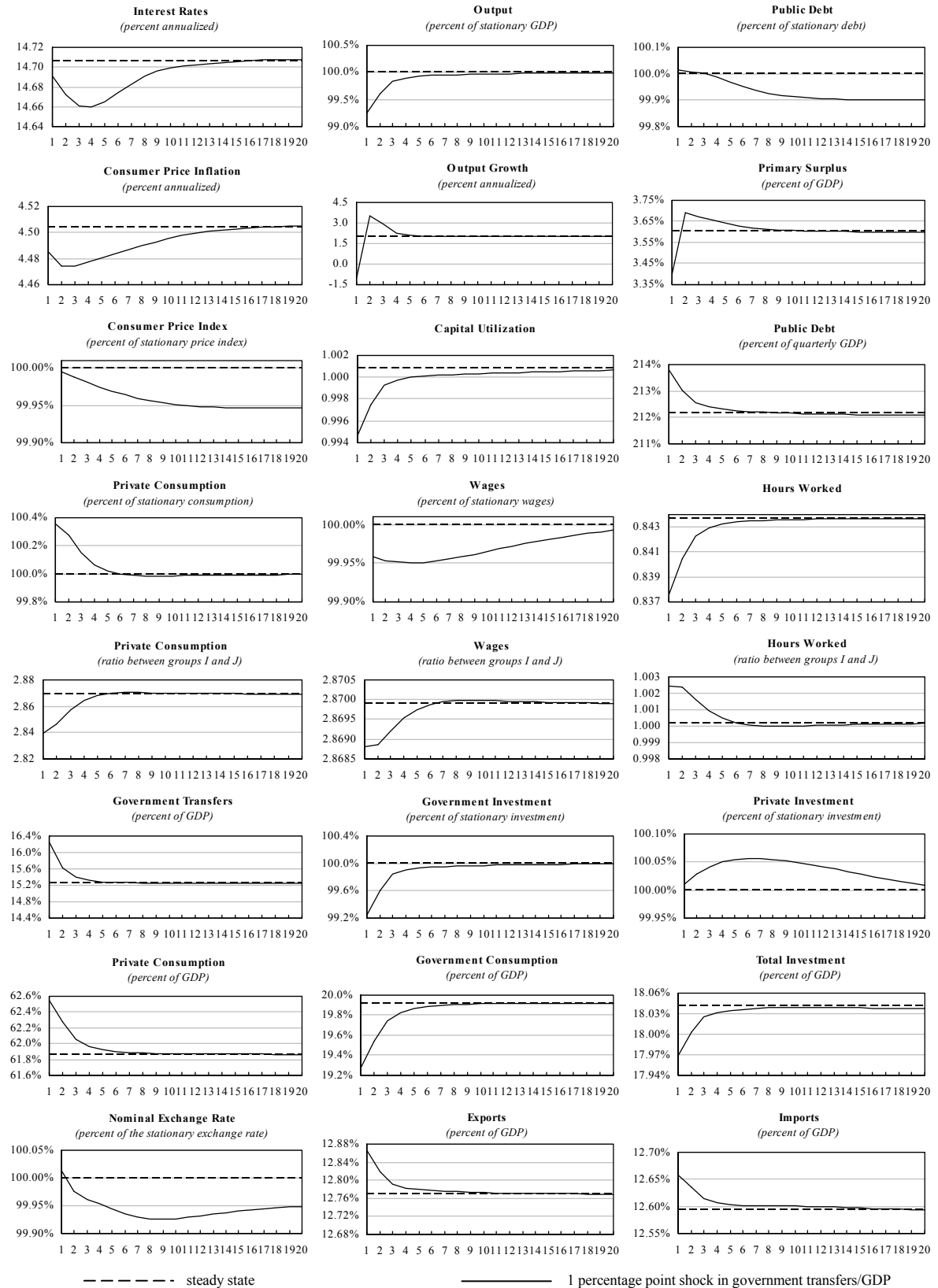


Figure 4

## Impulse responses to a shock to government investment

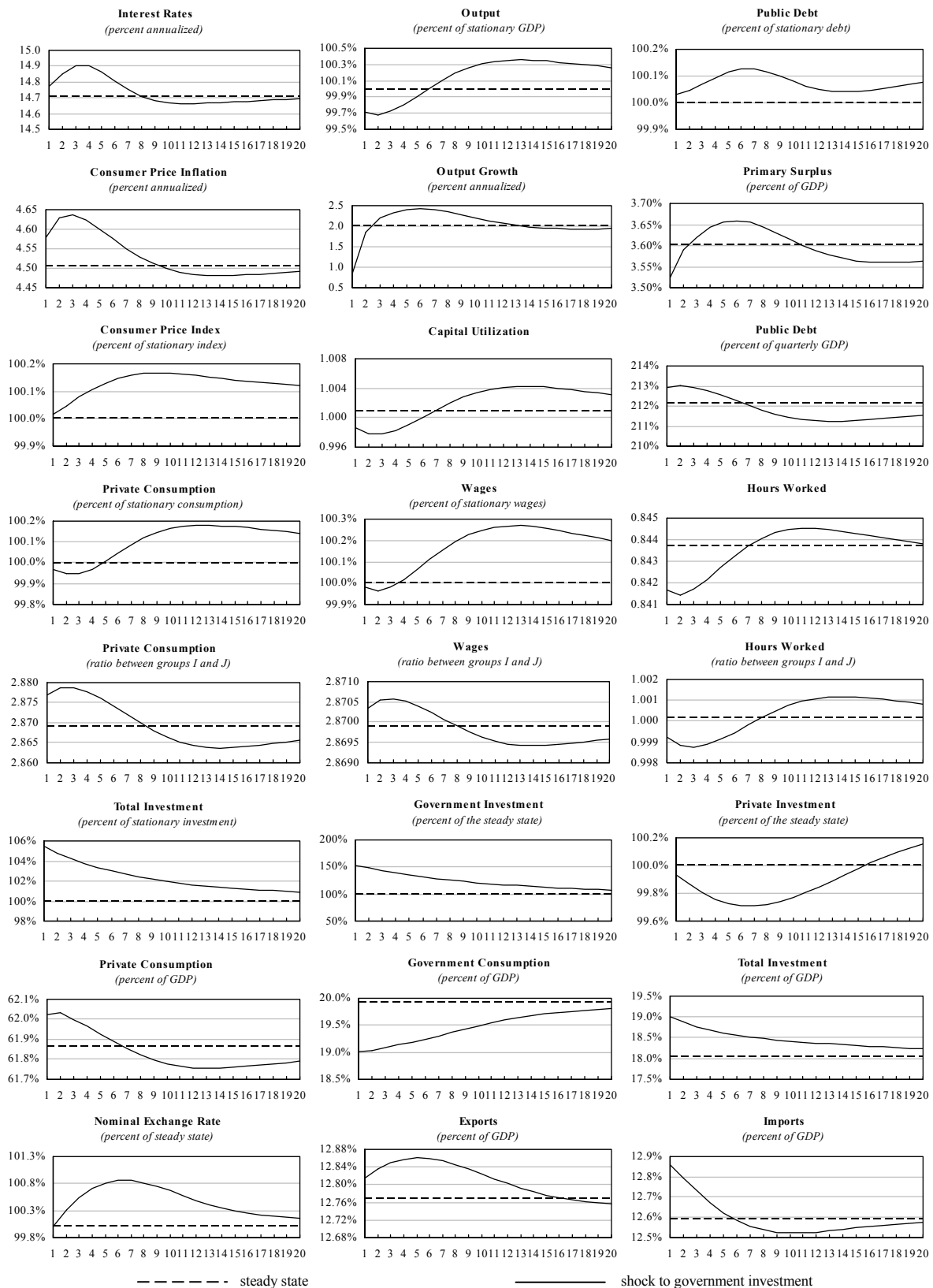


Figure 5

### Fiscal Commitment to the Steady State Level of the Public Debt: Impulse Responses of a Monetary Policy Shock

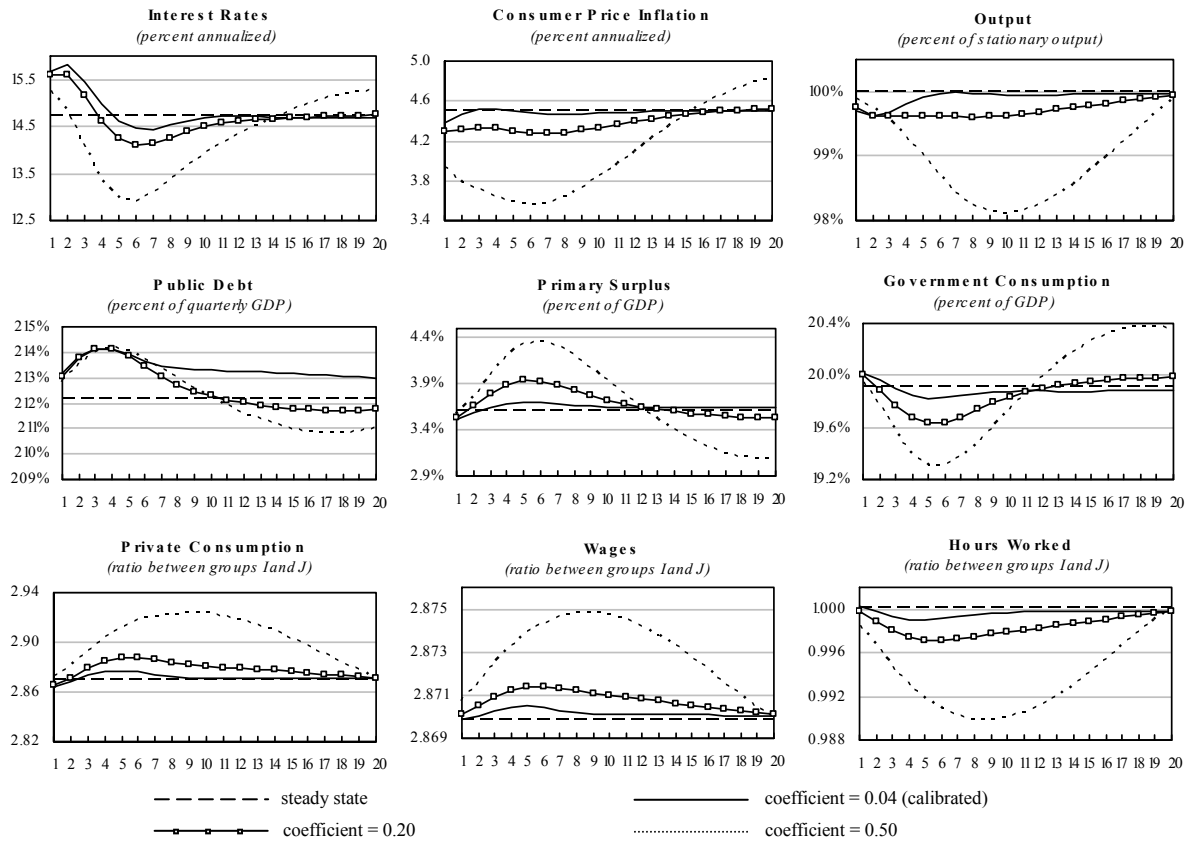
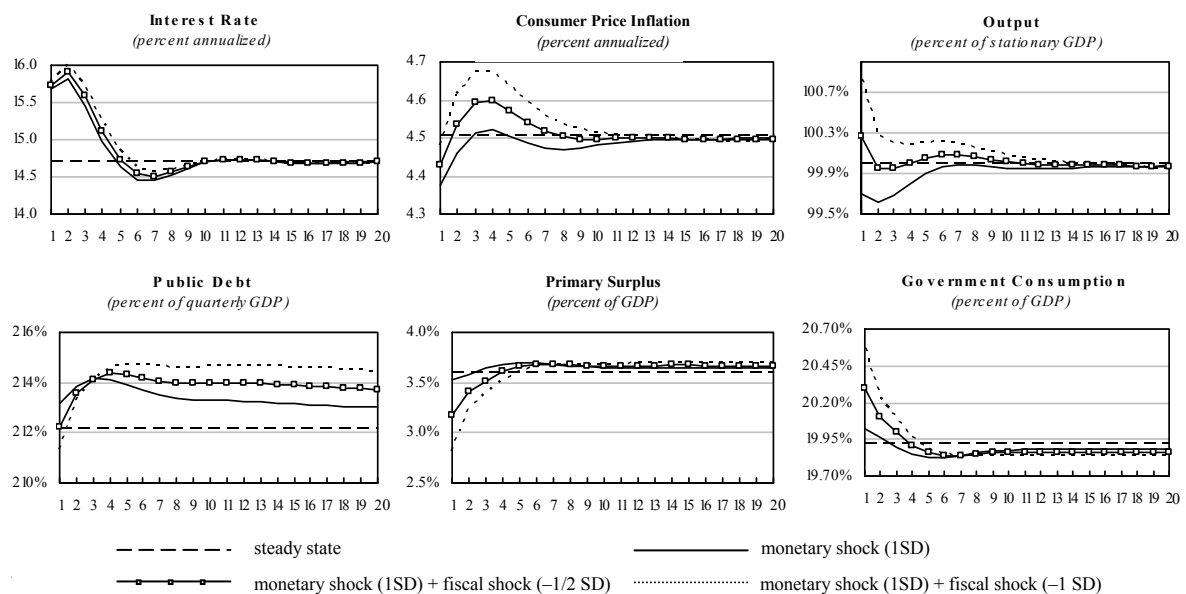


Figure 6

### Combination of Policy Shocks: Impulse Responses to a Monetary Policy Shock Varying the Rigor in the Implementation of the Fiscal Rule



ratio implies that the government will post a stronger reaction to events that drive the public debt as a share of GDP away from its stationary trajectory. A contractionist monetary policy<sup>10</sup> increases interest rates and thus the service of the debt, which then triggers a reaction from the fiscal policy to stabilize the debt-to-GDP ratio. The stronger the reaction of the fiscal policy to the debt, the stronger the impact on output and inflation. The monetary policy rule then reacts to the effects on inflation from these economic conditions, lowering interest rates. The extreme case presented in the first plot, which corresponds to the case where the fiscal response to the debt is the greatest, illustrates that the initial increase in interest rates should be promptly reversed followed by an intense expansionist reaction in the medium-run to contain the excessive contractionist impact from the fiscal feedback. This calls for some sort of coordination between fiscal and monetary policy to attain the best policy combination to reduce the volatility that arises in inflation and output when both policies are in place. The plots also show that a stronger reaction to the debt-to-GDP ratio skews the distributive effects of the monetary policy shock a little more in favor of the group of more specialized households (group *I*) who also have more investment alternatives.

Table 4 shows variances and variance-decomposition when only the fiscal and monetary policy shocks are active. Under varying degrees of commitment to the stationary level of the debt, an increase in the coefficient of the fiscal rule associated with the deviation of the debt from its steady state increases the volatility of consumer price inflation and the correlation between inflation and output growth. As to the volatility of the output growth, the effects are non-linear. The shock decomposition shows that the influence of the monetary shock on output growth variance attains its least value with a coefficient of 0.18, a level that also grants the least variance of output growth.<sup>11</sup> On the other hand, the greatest influence of the monetary policy shock onto inflation variance obtains with a coefficient of 0.31.

Assuming that it is desirable to have the monetary policy affecting inflation more than the fiscal shock and conversely for the case of the output growth, we sought for a standard deviation of the fiscal shock that could jointly minimize the influence of the primary surplus shock on inflation and of the monetary policy shock on GDP growth. For a 1 percentage point standard deviation of the monetary policy shock and for a degree of fiscal commitment that minimized the unconditional volatility of output growth, the degree of fiscal rigor in the execution of the fiscal rule that implements this outcome is 0.47. The moments and variance decomposition that result are portrayed in Table 5. In the following figures and tables, the 0.47 standard deviation of the fiscal shock is used as benchmark. Figure 6 shows the impulse responses to a combination of a contractionist monetary policy shock and expansionist fiscal policy shocks, varying the rigor with which the fiscal rule is implemented. In the short run, the fiscal policy shock nullifies the impact of the monetary policy shock on inflation, and in the medium run, it actually generates some inflation, the more so the greater the rigor in the implementation of the fiscal rule. As to the public debt, as the fiscal policy shock increases in magnitude, there is additional pressure on the debt, and its initial increase gets steeper, accompanied by a higher persistence to revert back to the steady state.

Table 6 shows the effects on the variances, co-variances and variance decompositions of different degrees of correlation between policy shocks. In this exercise we start from one of the specifications of the fiscal rule shown in Table 4, corresponding to the one (coefficient of 0.18) where output growth attains its lowest volatility and is least impacted by a monetary policy shock. When a contractionist monetary policy jointly occurs with a loosening fiscal shock, which in the table is represented in the columns of negative correlations, the unconditional volatility of inflation

<sup>10</sup> Notice that in the benchmark calibration of the monetary policy rule, the direct reaction of the monetary policy to output is null. As a result, the exercises shown in the subsections that follow are conditional on the adopted parameterization.

<sup>11</sup> This could be suggestive of a region where optimal fiscal policy may lie on, but to be conclusive on this, we would need to conduct optimal policy analysis, which is beyond the scope of this paper.

Table 4

**Higher Commitment with the Stationary Path of the Public Debt in the Fiscal Rule**

Moments of the shocks ( <i>percent</i> )								
SD of the monetary policy shock <sup>(1)</sup> = 1.00								
SD of the fiscal shock = 1.00								
Corr. between shocks <sup>(1)</sup> = 0.00								
Fiscal commitment to the public debt								
Coefficient in the fiscal rule	0.04 <sup>(2)</sup>	<b>0.18</b>	<b>0.31</b>	0.50				
Moments of endogenous variables ( <i>percent</i> )								
SD of cons. price inflation	0.10	0.20	0.44	1.04				
SD of GDP growth	1.30	<b>1.28</b>	1.37	1.93				
Corr. between variables	4.78	9.68	29.41	58.85				
Variance decomposition ( <i>percent</i> )								
↓variance / → shock	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS	MS	FS	MS	FS
Consumer price inflation	15.63	84.37	47.98	52.02	58.48	<b>41.52</b>	45.16	54.84
GDP growth	7.86	92.14	<b>5.22</b>	94.78	10.85	89.15	25.53	74.47

<sup>(1)</sup> SD = standard deviation / Corr. = correlation.<sup>(2)</sup> Calibrated value.<sup>(3)</sup> MS = monetary shock / FS = fiscal shock (to the primary surplus).

Table 5

**Greater Rigor in Implementation of the Primary Surplus Rule**

Moments of the shocks ( <i>percent</i> )								
SD of the monetary policy shock <sup>(1)</sup> = 1.00								
SD of the fiscal shock = <b>0.47</b>								
Corr. between shocks <sup>(1)</sup> = 0.00								
Fiscal commitment to the public debt								
Coefficient in the fiscal rule	0.04 <sup>(2)</sup>	<b>0.18</b>	<b>0.31</b>	0.50				
Moments of endogenous variables ( <i>percent</i> )								
SD of cons. price inflation	0.06	0.16	0.36	0.79				
SD of GDP growth	0.69	<b>0.66</b>	0.76	1.25				
Corr. between variables	24.41	14.81	39.12	65.23				
Variance decomposition ( <i>percent</i> )								
↓variance / → shock	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS	MS	FS	MS	FS
Consumer price inflation	45.12	54.88	80.36	19.64	86.21	<b>13.79</b>	78.51	21.49
GDP growth	27.45	72.55	<b>19.64</b>	80.36	35.06	64.94	60.34	39.66

<sup>(1)</sup> SD = standard deviation / Corr. = correlation.<sup>(2)</sup> Calibrated value.<sup>(3)</sup> MS = monetary shock / FS = fiscal shock (to the primary surplus).

Table 6

## Varying the Correlation Between Monetary and Fiscal Policy (Primary Surplus) Shocks

Moments of the shocks ( <i>percent</i> )										
SD of the monetary policy shock <sup>(1)</sup> = 1.00										
SD between fiscal shocks = <b>0.47</b>										
Corr. between policy shocks	0.80	0.50	0.00				<b>−0.50</b>		<b>−0.80</b>	
Fiscal commitment to the public debt										
Coefficient in the fiscal rule = <b>0.18</b>										
Moments of the variables ( <i>percent</i> )										
SD of cons. price inflation	0.19	0.18	0.16				0.13		<b>0.11</b>	
SD of output growth	0.80	0.75	0.66				0.55		<b>0.47</b>	
Corr. between variables	18.44	17.40	14.81				9.95		<b>4.25</b>	
Variance decomposition ( <i>percent</i> ) – when the 1 <sup>st</sup> shock is in monetary policy										
↓variance / → shock	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS	MS	FS	MS	FS	MS	FS
Consumer price inflation	95.27	4.73	88.74	11.26	80.36	19.64	78.70	21.30	86.04	13.96
GDP growth	80.49	19.51	53.70	46.30	19.64	80.36	<b>13.68</b>	86.32	44.07	55.93
Variance decomposition ( <i>percent</i> ) – when the 1 <sup>st</sup> shock is in the fiscal rule										
↓variance / → shock	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS	MS	FS	MS	FS	MS	FS
Consumer price inflation	80.63	19.37	53.94	46.06	19.64	80.74	<b>12.83</b>	87.17	42.86	57.14
GDP growth	95.23	4.77	88.68	11.32	80.36	19.64	78.90	21.10	86.33	13.67

<sup>(1)</sup> SD = standard deviation / Corr. = correlation.

<sup>(2)</sup> Calibrated value.

<sup>(3)</sup> MS = monetary shock / FS = fiscal shock (to the primary surplus).

and output growth falls. This result was in line with what the previous discussion on Figure 6 implied. Economic stimuli from expansionist fiscal and monetary shocks add variance to both inflation and output, and also expand the correlation between these two variables.

Table 7 shows the impact of monetary policy rules that react more to deviations of expected inflation from the target. Notice that the coefficient of reaction to output growth is null under all monetary policy rules that we experiment with here. In this exercise, we used the same specification for the fiscal rule in Table 6. Under these assumptions, a more hawkish monetary policy enacts a reduction in the variances of inflation and output growth. It also reduces the correlation between these two variables. However, as monetary policy becomes more hawkish, the fiscal shock gains some power to explain the variance of consumer price inflation. When the coefficient attached to inflation targets is set at 2.44, the monetary policy shock has the smallest influence on the variance of the output growth.<sup>12</sup>

We find an specific combination of monetary and fiscal commitment that grants the lowest volatility in output growth, bearing in mind that the benchmark monetary policy rule does not react

<sup>12</sup> This result is not indicative of an optimal reaction of monetary policy to stabilize output, as it is conditioned on the fact that the calibrated monetary policy rule does not react directly to output growth, while the fiscal rule does.

Table 7

## Varying the Monetary Policy Commitment to the Inflation Target

Moments of the shocks ( <i>percent</i> )								
SD of the monetary policy shock <sup>(1)</sup> = 1.00								
SD of the fiscal shock = <b>0.47</b>								
Corr. between shocks <sup>(1)</sup> = 0.00								
Fiscal commitment to the public debt								
Coefficient in the fiscal rule = <b>0.18</b>								
Monetary policy commitment to the inflation target								
Coefficient in the mon. policy rule	1.20	1.57 <sup>(2)</sup>	<b>2.44</b>	5.2				
Moments of endogenous variables ( <i>percent</i> )								
SD of cons. price inflation	0.82	0.16	0.07	0.04				
SD of GDP growth	0.73	0.66	0.63	0.61				
Corr. between variables	25.52	14.81	8.40	0.00				
Variance decomposition ( <i>percent</i> )								
↓variance / → shock	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS	MS	FS	MS	FS
Consumer price inflation	93.01	6.99	80.36	19.64	64.72	35.28	60.37	39.63
GDP growth	29.57	70.43	19.64	80.36	<b>18.13</b>	81.87	22.08	77.92

<sup>(1)</sup> SD = standard deviation / Corr. = correlation.

<sup>(2)</sup> Calibrated value.

<sup>(3)</sup> MS = monetary shock / FS = fiscal shock (to the primary surplus).

directly to output conditions. Such combination is shown in the second column of Table 8. It increases the share of inflation variance that is attributed to the monetary policy shock, although the highest stake is still with the fiscal shock.

#### 4.2.2 Fiscal and monetary policy activeness

In Dynare, the model shows a unique solution for time paths of endogenous variables under two regions of policy activeness<sup>13</sup> (Figure 7), maintaining the remaining parameters as they were originally calibrated. Under active monetary policy ( $\phi_{\pi} > 1.1$ ), the equilibrium is unique if the response of the fiscal rule to deviations of the public debt to its steady state ratio ( $\phi_{B_T}$ ) remains in the positive interval of  $[0.03, \infty)$ , where the original calibrated parameter belongs, or in the interval  $(-\infty, -1.21)$ . In the former interval, the stronger the reaction of the fiscal rule to the debt-to-GDP ratio, the more cyclical are the responses of the output (Figure 8).

The model also shows a unique solution (in Dynare) in regions where monetary policy is passive (5<sup>th</sup> to 8<sup>th</sup> columns of Figure 8).<sup>14</sup> Again, the greater the magnitude of the reaction of the

<sup>13</sup> Active and passive policies are used here in the sense described in Schmidt-Grohé and Uribe (2006) and Leeper (1991). Woodford (2003) uses the term “locally Ricardian” for active policies.

<sup>14</sup> Schmidt-Grohé and Uribe (2006) also obtain regions of implementable policy with Taylor coefficients lower than 1.



Table 8

**Policy Rules That Minimize Output Volatility**

Moments of the shocks ( <i>percent</i> )				
SD of the monetary policy shock <sup>(1)</sup> = 1.00				
SD of the fiscal policy shock = 1.00				
Corr. between shocks <sup>(1)</sup> = 0.00				
Fiscal commitment to the public debt				
Coefficient in the fiscal rule	0.04 <sup>(2)</sup>		<b>0.27</b>	
Monetary policy commitment to the inflation target				
Coefficient in the mon. policy rule	1.57 <sup>(2)</sup>		<b>4.50</b>	
Moments of endogenous variables ( <i>percent</i> )				
SD of cons. price inflation	<b>0.10</b>		<b>0.10</b>	
SD of output growth	1.30		<b>1.17</b>	
Corr. between variables	4.78		-15.58	
Variance decomposition ( <i>percent</i> )				
↓variance / → shock	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS
Consumer price inflation	15.63	84.37	25.31	<b>74.69</b>
GDP growth	7.86	92.14	<b>3.88</b>	96.12

<sup>(1)</sup> SD = standard deviation / Corr. = correlation.

<sup>(2)</sup> Calibrated value.

<sup>(3)</sup> MS = monetary shock / FS = fiscal shock (to the primary surplus).

fiscal rule to the debt-to-GDP ratio, the stronger the cyclicity of the responses. However, for practically null responsiveness of the fiscal rule to the debt and of the monetary policy rule to the inflation target, the model reestablishes lower cyclicity.

#### 4.2.3 Alternative types of monetary policy rules

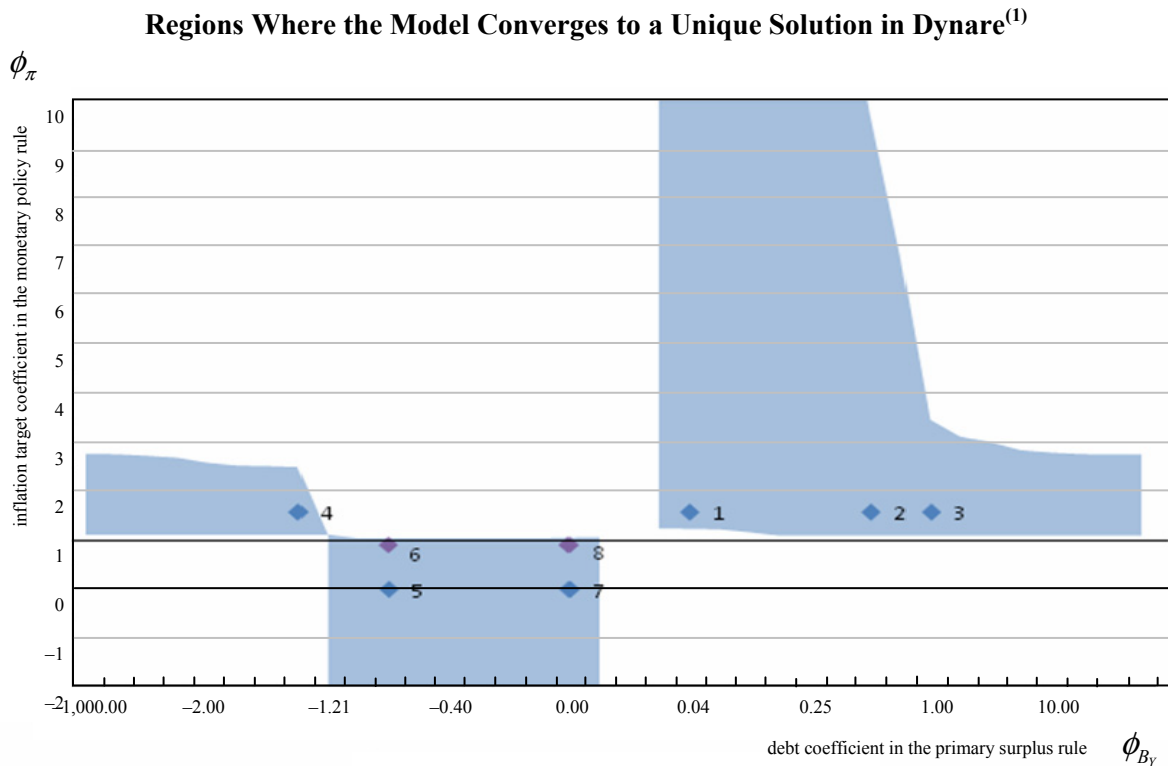
The model can also be used to analyze the effects of adopting a distinct monetary policy rule. Table 9 compares the moments and shows a variance decomposition of key endogenous variables under alternative types of monetary policy rules. If the monetary policy rule directly reacts to changes in the exchange rate,<sup>15</sup> the volatility of inflation and output growth reduces. The absolute magnitude of the correlation between economic growth and inflation drastically reduces.

If the monetary policy rule reacts to the gap in output growth,<sup>16</sup> the variance in output growth reduces, albeit with an increase in the variance of consumer price inflation and the exchange rate. The monetary policy shock also contributes less to the variances of inflation, output growth and the exchange rate.

<sup>15</sup> The coefficient of reaction to the deviation of changes in the exchange rate from its steady state was arbitrarily set at 1 in this exercise.

<sup>16</sup> The coefficient of reaction to the deviation of output growth from its steady state was arbitrarily set at 0.79 in this exercise.

Figure 7



<sup>(1)</sup> The regions of convergence were plotted only for the interval  $\phi_{B_y} \in (-1000, 100)$  and  $\phi_\pi \in (-2, 10)$ . The colored region continues in the area beyond the plotted limits.

The numbered dots represent the points selected to draw impulse responses in Figure 8.

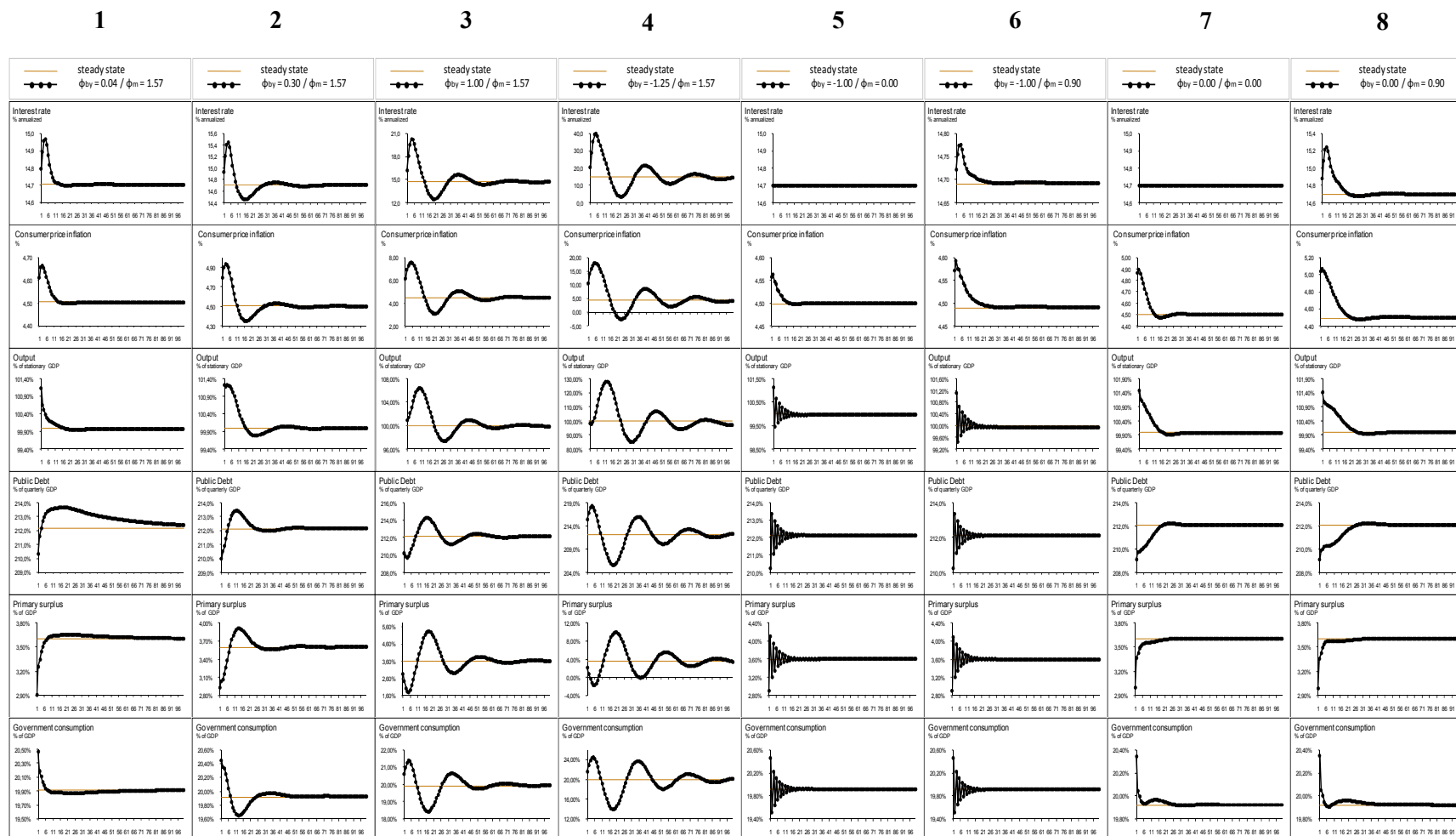
Impulse responses to different types of monetary rules have distinct shapes. Figure 9 shows that the introduction of an explicit reaction of the monetary policy to either output growth or to changes in the exchange rate brings about greater persistence to the drop in inflation. The initial impact on output growth is a little milder, yet the persistence is also more pronounced. Backward looking rules, on the other hand, do not substantially alter the dynamics of the main macroeconomic variables after a monetary policy shock.

## 5 Conclusion

In this paper we revised the work in CMS and CCW, correcting important equations relating to prices, wages and the aggregate resource constraint of the economy. In addition, in order to better approximate the modeled economy to the current practice of fiscal policy in a number of countries, including Brazil, we introduced a different modeling strategy of the fiscal sector. We let the government track a primary surplus and a debt-to-GDP target, using its instrument also as a response to economic conditions, and allowed the government to invest and the private sector to decide upon the utilization of public and private capital. We also extended the model to introduced labor specialization in order to allow for wage heterogeneity amongst households that supply the same amount of worked hours.

Figure 8

**Some Plots of Impulse Responses to a Fiscal Policy Shock Under Distinct Combinations of Policy Parameters  
in the Regions Where the Model Converges to a Unique Solution in Dynare<sup>(1)</sup>**



<sup>(1)</sup> The numbers in each column of graphs indicate the combinations of policy reactions plotted (and equally numbered) in Figure 7.

Table 9

**Alternative Monetary Policy Rules**

Moments of the shocks ( <i>percent</i> )						
SD of the monetary policy shock <sup>(1)</sup> = 1.00						
SD of the fiscal policy shock = 1.00						
Corr. between shocks <sup>(1)</sup> = 0.00						
Monetary policy rules						
	calibrated model		calibrated rule + reaction to the exchange rate		calibrated rule + reaction to the output growth	
Moments of endogenous variables ( <i>percent</i> )						
SD of inflation	0.10		<b>0.04</b>		0.41	
SD of GDP growth	1.30		1.27		<b>0.85</b>	
SD of exchange rate variation	0.68		<b>0.22</b>		1.28	
Corr. between consumer price inflation and GDP growth	4.78		0.46		−7.51	
Corr. between consumer price inflation and exchange rate variation	48.84		40.25		46.36	
Corr. between GDP growth and exchange rate variation	8.58		-25.58		−78.61	
Variance decomposition ( <i>percent</i> )						
	MS <sup>(3)</sup>	FS <sup>(3)</sup>	MS	FS	MS	FS
Consumer price inflation	15.63	84.37	97.67	<b>2.33</b>	10.14	89.86
GDP growth	7.86	92.14	<b>1.75</b>	98.25	2.80	97.20
Exchange rate variation	89.4	10.6	86.16	13.84	<b>5.1</b>	94.9

<sup>(1)</sup> SD = standard deviation / Corr. = correlation.

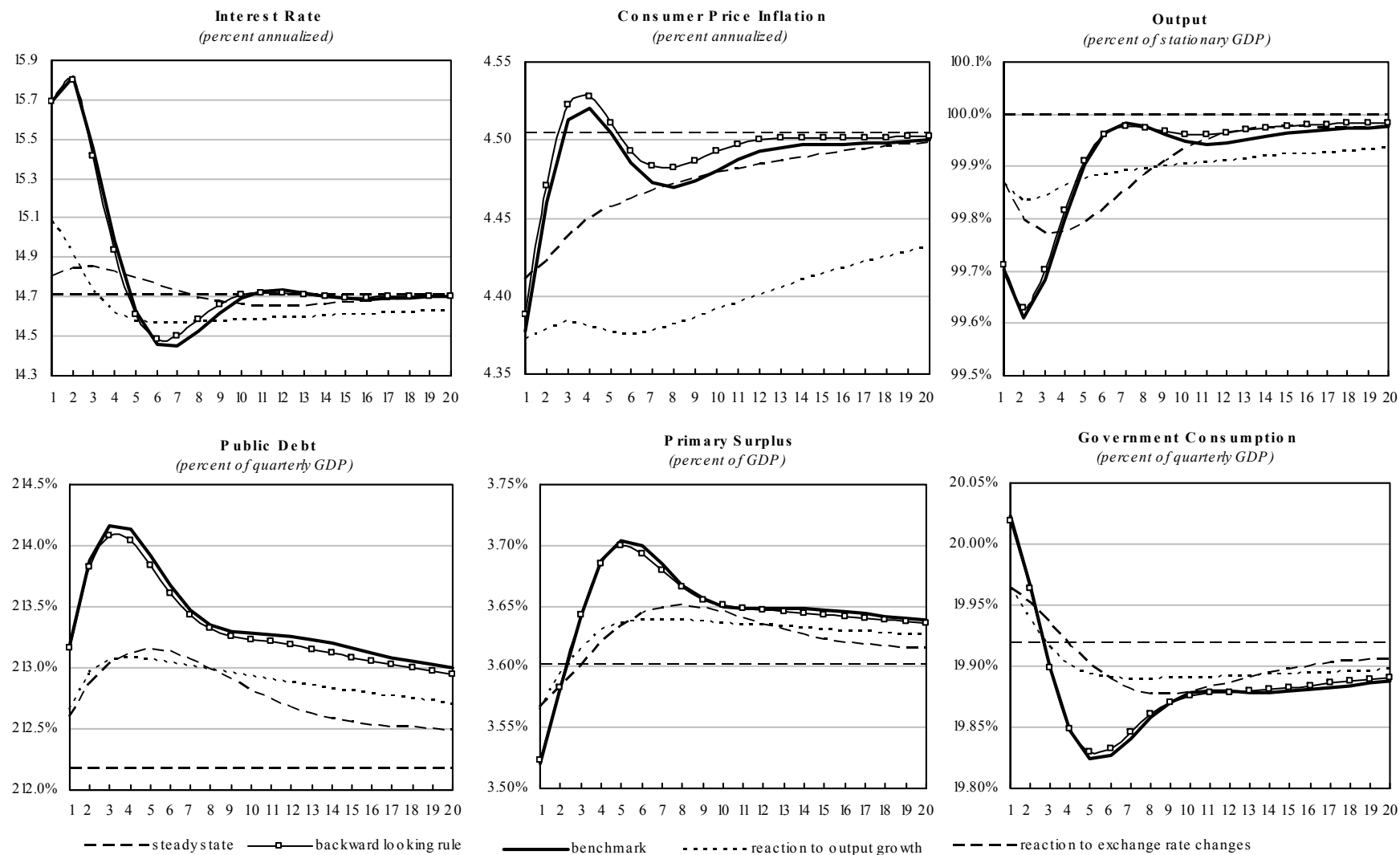
<sup>(2)</sup> Calibrated value.

<sup>(3)</sup> MS = monetary shock / FS = fiscal shock (to the primary surplus).

Under the adopted calibration, the model responses to monetary policy shocks are short-lived. The simulations show an important endogenous interaction of monetary policy conditions with fiscal policy responses, although policy rules are not directly responsive to one another. Expansionist primary surplus shocks can boost economic activity, yet with significant implications to inflation. Shocks to government investment also put pressure on inflation, and, although the immediate response of output growth is negative, it soon reverses to a prolonged economic expansion. On the other hand, the simulations show that fiscal transfer shocks, aimed at redistributing income, negatively affect general economic conditions as consequence of the fiscal rule.

**Figure 9**

### Impulse Responses to a 1 Percentage Point Monetary Policy Shock Under Alternative Monetary Policy Rules



Different specifications for the policy rules significantly affect the results implied by the model. The simulations with different degrees of fiscal commitment to the stationary path of the public debt and with greater rigor in the implementation of the primary surplus rule make explicit that the strength of one policy affects the impact of the other on important variables such as output and inflation. Increasing fiscal commitment to the stationary debt-to-GDP ratio enhances the contractionist impact of a monetary policy shock upon inflation, albeit at the cost of a higher impact on output growth in the medium-run. The volatility of inflation and output growth increases, as does the correlation between them. On the other hand, a more rigorous implementation of the primary surplus rule implies, as expected, lower variance of inflation and output growth, but the correlation between them increases with the degree of rigor.

Simultaneous shocks to the primary surplus rule and to monetary policy make explicit the contrasting objectives of these policies. Primary surplus shocks dampen the contractionist effect of the monetary policy shock onto inflation and output, and also reduce the variance of inflation and output growth.

A higher commitment to the inflation target in the monetary policy rule reduces the variance of inflation and output growth, and their correlation, with the drawback that the fiscal shock gains importance in affecting the variance of inflation.

Different specifications of monetary policy rules also yield qualitatively distinct predictions. Rules that directly react to changes in the exchange rate or to the output gap reduce the variance of output growth. However, an explicit reaction to the output growth increases the variance of inflation. A monetary policy reaction to the exchange rate holds the following outcomes: the variance of inflation and the correlation between inflation and output growth reduce, and the monetary policy shock gains a much greater stake at the variance of inflation.

Our model finds stable equilibria in regions where the fiscal policy rule is active and the Taylor principle does not hold. Impulse responses with some combinations of policy reactions in the region of fiscal-activeness show that the responses can be either well-behaved or strongly cyclical. For these cases, the model reestablishes lower cyclicity for practically null responsiveness of the fiscal rule to the debt and of the monetary policy rule to the inflation target.

## **APPENDIX**

Please contact the authors to request a copy of the Appendix, or download a complete version of the working paper at <http://www.bcb.gov.br/pec/wps/ingl/wps204.pdf>

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## SHORT-TERM MACROECONOMIC EFFECTS OF THE FISCAL STIMULUS MEASURES IN AUSTRIA

*Serguei Kaniovski\* and Margit Schratzenstaller\**

*Like most industrialized countries and many developing countries, Austria has taken measures to stabilise financial markets and to mitigate the sharp decrease in economic activity caused by the recent financial crisis. These measures amount to 4.2 per cent of 2008 GDP. Model simulations show that, together with fiscal measures adopted in the 10 major trading partner countries, the national stimulus packages may have slowed the decrease in Austrian real GDP by a cumulative 2.1 percentage points in 2010, preserving 41,500 jobs.*

### 1 Introduction

The financial crisis of 2008 has triggered the deepest recession since the Great Depression of 1930s. The Austrian economy has been adversely affected by the financial and economic crisis, albeit somewhat less severely than the euro area on average. Other than in the wake of the Great Depression, economic policy responded to the global financial and economic crisis in a determined and timely manner. In November 2008, the Austrian federal government adopted measures to stabilize the banking sector and to cushion the economic downturn, which are gradually being implemented.

Part of the federal government's stabilisation programme is the carrying-forward of income tax cuts into 2009, supplemented by two fiscal stimulus packages, a rescue package for the banking sector, and two labor-market packages. In addition, the Länder have adopted own programmes that focus on infrastructure investment.

This paper presents simulations of the short-term effect of the domestic fiscal stimuli and of those set by Austrian's most important trading partners on output and employment in Austria (Breuss, Kaniovski and Schratzenstaller, 2009). The effect of the national packages is estimated using the Macromod, a macroeconomic model of the Austrian economy developed at WIFO. The spill-over effect of the stimuli adopted by Austria's ten most important trading partners on the Austrian economy is estimated using the Oxford World Macroeconomic Model (OEF). Our discussion of the results focuses on the GDP multipliers of the revenue and expenditure measures. The calculations rest upon the assumption that all measures are actually implemented as planned, *i.e.*, there is no implementation lag. The time horizon for the simulations is 2010.

In most industrialized countries, the fiscal response to the imminent economic recession has been swift and coordinated, which poses the question of the size of spill-over effects on the national economy. This question is especially important for small open economies such as Austria with imports and exports in 2009 being, respectively, 46 and 51 per cent of the nominal GDP. An assessment of spill-over effects for several large industrialized countries has been undertaken in OECD (2009). Model simulations by the OECD (2009, Table 3.7) show that for the USA this effect is about half as high as the effect of the US fiscal measures. For the average of the Euro area the effect is smaller.

In order to obtain the total effect of fiscal packages on the Austrian economy we have linked the OEF World model with a model of the WIFO model of the Austrian economy that is more detailed than the model for Austria supplied with the OEF. In addition to the demand effect, our simulations take account of changes in terms of trade, interest rates and the Euro/US Dollar

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exchange rate that cannot be fully implemented in a national model, and thus would not be fully accounted for. Our simulations for Austria show this effect to be about half as high as the effect of the fiscal measures taken on the national level. This confirms the importance of including the spill-over effects in assessment of the effectiveness of fiscal policy measures taken in response to the recent financial and economic crisis.

## 2 Stimulus programmes adopted by the main trading partners

In late March 2009, *OECD* (2009) published an overview of volume and timing of stimulus programmes implemented or planned by the 30 OECD member countries as of 24 March 2009. The volume is defined as a cumulated net effect on the general government balance over the period from 2008 to 2010, as percent of 2008 GDP, disaggregated to broad expenditure and revenue measures within the national account framework. The main findings were:

- Fiscal stimuli have been set in almost all OECD countries. The budgetary effect of these programs is typically smaller than that of the automatic stabilisers or other discretionary fiscal measures. The volumes differ markedly across countries. An unweighted average of the stimulus packages in the OECD countries (*i.e.*, those sets of measures giving a positive impulse to growth) cumulated over the period 2008 to 2010 amounts to 2.7 per cent of GDP, of which 1.6 per cent of GDP is due to tax cuts and 1.1 per cent of GDP to spending increases. The largest package has been adopted by the USA (5.6 per cent of GDP), the smallest by Switzerland (0.5 per cent of GDP). In five countries (USA, Australia, Canada, Korea and New Zealand), they exceed 4 per cent of 2008 GDP, while four countries (Italy, Ireland, Iceland and Hungary) assume a neutral or restrictive fiscal policy stance.
- Estimates based on the crisis-induced low fiscal multipliers suggest a growth effect of around 0.5 per cent of GDP in the OECD. The largest US package is expected to raise the US GDP by more than 1 per cent (2009: 1.3 per cent, 2010: 1.5 per cent). This estimate does not include international spillovers.
- The more effective the automatic stabilisers, the smaller are the national discretionary stimulus packages. On average, the impact of the automatic stabilisers is three times as high as that of the discretionary measures.
- Most OECD countries outside the G-7 focus on tax cuts, whereas tax cuts are less dominant among the G-7. Priority is given to cuts in personal income tax against cuts in business taxes. Almost all OECD countries resort to additional public investment or to the carrying-forward of planned projects. In many cases, transfers to private households are being increased, particularly for low-income earners. Some countries also increased subsidies to firms.
- Most OECD countries planned the bulk of their stimulus programmes for the year 2009.

Table 1 gives an overview of the volume and timing of the budgetary effects in Austria's ten major trading partner countries (*OECD*, 2009, p. 111). The measures planned for the period from 2008 to 2010 range from a strong fiscal expansion (5.6 per cent of nominal GDP of 2008) in the USA to a fiscal contraction of 4.4 per cent of GDP in Hungary. Germany, Austria's most important trading partner, has adopted measures totaling 3.0 per cent of nominal GDP. In most countries the measures take effect in 2009. On average of the 11 countries, the stimulus packages for 2008 to 2010 correspond to 1.4 per cent of 2008 GDP; if the comparison is confined to those countries in which fiscal policy is expansionary, the budgetary impact is 2.2 per cent of 2008 GDP. The expenditure-increasing measures account for 0.3 per cent and 0.9 per cent of GDP, respectively, the revenue cuts for 1.1 per cent and 1.3 per cent.

According to the analysis by the OECD, the Austrian package totalling 1.1 per cent of GDP (expenditure increase 0.3 per cent, tax cuts 0.8 per cent) is both below the OECD average and

Table 1

**Size and Time Profile of the Stimulus Programmes  
Adopted by Austria's Main Trading Partners**

	Net Impact on General Government Balance			Distribution 2008-10		
	2008-10			2008	2009	2010
	Expenditure	Taxes	Total			
	(percent of 2008 GDP)			(percent share of net impact)		
Germany	-1.4	-1.6	-3.0	0	46	54
Italy	-0.3	0.3	0.0	0	15	85
USA	-2.4	-3.2	-5.6	21	37	42
Switzerland	-0.3	-0.2	-0.5	0	68	32
France	-0.4	-0.2	-0.6	0	75	25
Czech Republic	-0.5	-2.5	-3.0	0	66	34
UK	0.0	-1.5	-1.4	15	93	-8
Hungary	4.4	0.0	4.4	0	58	42
Spain	-1.9	-1.6	-3.5	31	46	23
Poland	-0.6	-0.4	-1.0	0	77	23
Austria	-0.3	-0.8	-1.1	0	84	16
OECD 11						
Unweighted	-0.3	-1.1	-1.4	6	61	33
Only positive impact						
Unweighted	-0.9	-1.3	-2.2	7	66	29
G7	-1.6	-2.0	-3.6	17	43	40
OECD total						
Unweighted	-0.7	-1.2	-2.0	10	53	37
Weighted	-1.5	-1.9	-3.4	17	45	39
Only positive impact						
Unweighted	-1.1	-1.6	-2.7	9	53	38
Weighted	-1.7	-2.0	-3.7	17	45	39

Source: OECD, WIFO.

below the average for the 11 countries shown in Table 1. This may be explained by the following factors:

- the OECD study does not include off-budget measures that play an important role in Austria. Investment projects by the road financing agency (Asfinag), the Federal Real Estate Agency (BIG) and the Austrian Railways (ÖBB) belong to this category;
- although the aim of the OECD was to include all measures, the fiscal packages adopted by the Länder were omitted;
- of the permanent tax cuts enacted with the tax reform 2009, only the revenue shortfall for 2009 is taken into account. The OECD argues that the tax cuts for 2010 would have been implemented notwithstanding the crisis;

- lastly, the OECD study includes only some of the measures aimed at lowering the financing costs for businesses.<sup>1</sup>

In quantifying the inputs for model simulations we disaggregate the measures on the revenue side into personal taxes, business taxes, consumption taxes, social security contributions and a residual category of other revenues. On the contrary, we treat the expenditures as one category. While the diversity of the measures on the expenditure side precludes their disaggregation in a manner that is consistent among the countries, their effect is essentially identical in the highly aggregated macroeconomic models used for simulations.

### 3 Stabilisation measures taken by Austria

#### 3.1 *Stabilisation measures adopted by the federal government*

In line with efforts at the international level to support aggregate demand, Austria resorts to a fiscal policy mix of tax cuts and spending increases. The measures included in model simulations comprise the stimulus packages I and II, and the tax cuts carried forward from 2010 into 2009. They can be grouped into four categories (total amount 2009-10 in millions of euros):

- increase in infrastructure investment (€ 1,435 million),
- lowering of companies' financing cost (€ 2,080 million),
- increase in private household disposable income (€ 5,953 million),
- increase in public consumption and subsidies (€ 370 million).

Table 2 gives an overview of the volume and timing of these packages.<sup>2</sup> Together the two packages and the tax cuts amount to 3.5 per cent of nominal GDP, rising to 4.2 per cent of GDP if the measures by the Länder are included. This shows that Austria belongs to the group of countries that adopted large stimulus programs relative to their GDP.

The investment initiative of the federal government foresees an increase in building and infrastructure investment by € 1.4 billion in 2009 and 2010, of which € 1,015 million will have a direct budgetary impact. Asfinag and ÖBB will invest € 450 million in transportation networks. Unlike the investment by ÖBB, that by Asfinag will be financed out of current revenues and therefore not burden the federal budget, whereas a small part of the ÖBB investment will have an impact on the budget. Further plans concern investment in energy conservation for buildings owned by the Federal Real Estate Agency (BIG) as well as the construction or renovation of schools, universities and administrative facilities.

The federal government programme sets incentives for private construction investment. Budget outlays of € 50 million for energy conservation in commercial buildings and of another € 50 million for private households are to generate an additional € 300 million in non-residential and residential construction output in 2009 and 2010. In 2009, € 10 million are allocated to investment in broadband technology.

<sup>1</sup> The difficulty of international comparisons is illustrated by a comparison of the OECD findings with those of Saha and Von Weizsäcker (2009), which cites a budgetary effect of 1.3 per cent of GDP for Austria in 2009. Also the IMF, 2009 estimates of the fiscal cost of discretionary measures by the G-20 differ substantially from those of the OECD. The volume of the Austrian stabilization measures is best reflected in an overview published in June 2009 by the European Commission (European Commission, 2009A and 2009B), according to which the Austrian stimulus measures of 1.8 per cent of GDP are second-largest in the EU. Spain's package was larger in 2009 (2.3 per cent of GDP); Germany's in 2010 (1.9 per cent of GDP).

<sup>2</sup> For the tax measures raising private disposable income of households, Table 2 refers to the respective amounts after full implementation as from the year of introduction, since it is not the budgetary effects that are relevant (which may lag due to conventions of tax collection) but the economic effect. For this reason, the data differ slightly from those presented in Schratzenstaller (2009).

Table 2

## Tax Reform and Measures Included in Stimulus Packages I and II

	2009 (millions of euros)	2010 (millions of euros)	
<i>Federal level (government programme)</i>	4,702.5	5,135.0	
Infrastructure investment	690	745	
ÖBB	175	175	Stimulus package I
Asfinag	50	50	Stimulus package I
BIG	355	520	Stimulus package II
Broadband services	10	0	Stimulus package I
Energy-saving renovation	100	0	Stimulus package II
Lowering of corporate financing cost	840	1,240	
Accelerated depreciation	0	250	Stimulus package II
Profit tax allowance	0	150	Tax reform
Third-party credits EIB <sup>(1)</sup>	200	200	Stimulus package I
Interest-subsidised ERP credits	200	200	Stimulus package I
Higher guarantee ceiling aws	400	400	Stimulus package I
Silent participations aws	40	40	Stimulus package I
Increase in private disposable income	2,987.5	2,965.0	
Income tax cuts	2,300	2,300	Tax reform
Family “package”	510	510	Tax reform
Tax deductability of sponsoring	100	100	Tax reform
Subsidised homebuilding	20	20	Stimulus package I
Regional employment “package”	35	35	Stimulus package II
Car scrapping premium	22.5	0.0	
Government consumption	120	120	
Compulsory pre-school year free of charge	70	70	Stimulus package II
Research and development	50	50	Stimulus package II
Subsidies	65	65	
Regional employment “package”	40	40	Stimulus package II
Globalisation “campaign”	25	25	Stimulus package I
<i>Länder</i>	1,073.2	1,007.7	
Infrastructure investment	876.8	876.8	
Increase in transfers	196.3	130.9	
<i>Total</i>	5,775.7	6,142.7	

Source: Federal Ministry of Economics, Families and Youth, IHS, WIFO. - Asfinag = Autobahnen- und Schnellstraßen Finanzierungs-Aktiengesellschaft, BIG = Federal Real Estate Agency, ÖBB = Austrian Railways.

<sup>(1)</sup> Small and medium-sized enterprises, research and development.

The measures designed to lower financing cost and strengthen the equity base of Austrian businesses may be summarised into three groups: strengthening of the equity base through silent partnerships, interest-subsidised loans and accelerated depreciation rules.

Among the measures supporting the purchasing power of private households, the tax reform carried forward into 2009 is the most important one. The cut in tax rates will lower the tax burden on households by € 2.3 billion per year. Additional tax concessions for families will increase the disposable income by € 510 million per year. To this category includes several tax rebates that cover charities, homeowner savings and loans, measures from the employment package and the car scrappage premium.

The remaining € 370 million in additional federal spending is included partly as government consumption and partly as subsidies. Included in this category is the funding of a newly-introduced compulsory pre-schooling year and the reinforcement of funds for research by € 70 million and € 50 million for 2009 and 2010, respectively, and € 65 million per year for the regional employment package and measures aimed at increasing exports.

### 3.2 *Measures taken by the Länder*

The federal states are planning a series of cyclical stabilisation measures which in the simulations with the WIFO macroeconomic model are captured in a simplified way either as investment or as addition to private disposable income. The measures at the Länder level are predominantly investment programmes, notably construction; of lower importance are commercial subsidies and transfers to households. In 2009 and 2010, the Länder plan additional infrastructure investment of nearly € 880 million, respectively, and an increase in transfer payments by almost € 200 million in 2009 and € 130 million in 2010. In total, the Länder “packages” amount to € 1,073 billion in 2009 and € 1,008 billion in 2010, together € 2,081 billion.

## 4 **Simulation results**

For a simulation of the overall effects of the expansionary fiscal measures described above, two macroeconomic models are used: the impact of measures taken by Austria’s key trading partners on the domestic economy are estimated on the basis of the Oxford World Macroeconomic Model (OEF, 2005), the effects of the measures taken in Austria by the federal government and the Länder using the WIFO macroeconomic model (Baumgartner, Breuss and Kaniovski, 2004).

WIFO-Macromod is a medium-scale econometric model of the Austrian economy designed for medium term forecasting and economic policy simulations. We use this model to analyze the impact of global economic developments on Austria and explore both the intended and the unintended consequences of domestic fiscal policies such as tax reforms, public spending, and budget cuts. WIFO-Macromod is a structural econometric model that is based on the income-expenditure framework, with supply-side elements used for price and wage determination. We estimate a trend output using a production function and use an output gap as a proxy for the aggregate rate of capacity utilization.

In WIFO-Macromod, Austria is modeled as a small open economy in the European Economic and Monetary Union (EMU). The repercussions of economic activity in Austria on the rest of the world are neglected and variables describing the world economic conditions, including those of European economic policy authorities, are set as exogenous. Specifically, we treat the income of Austria’s trading partners, the Euro-U.S. dollar exchange rate, short and long-term interest rates and world prices for tradable goods and services as exogenous. In the simulations of



the spillover effects these variables are borrowed from the OEF Model. In terms of the theoretical underpinning, the OEF model is very similar to the WIFO-Macromod but covers a large number of countries interconnected by trade flows and prices. The results of the simulations are summarized in Table 3.

#### 4.1 *Investment initiative*

The federal government's investment initiative increases gross fixed capital formation by a cumulated 1.8 per cent above baseline, *i.e.*, a scenario without these government measures. As could be expected, investment in construction will post the strongest increase. Investment in machinery and equipment increases due to an accelerator effect. The imports increase by 0.3 per cent. The resulting cumulated increase in GDP is 0.3 per cent. The positive demand shock leads to an increase of 7,200 jobs and a decline in the unemployment rate by 0.1 percentage points. Labour productivity and real per capita wages will edge up only modestly, such that the increase in the wage bill is mainly due to the job creation. The marginal inflation-enhancing effect can be neglected.

Underlying the calculations is the assumption of timely implementation of the planned investment. In the case of delay, the macroeconomic impulse will materialize only with a lag.

#### 4.2 *Increase in private disposable income*

The measures taken by the federal government raise real disposable income of households by 1.6 per cent. Since only part of the gain is used for consumption, private consumption grows by a cumulated 1.1 per cent. Because of the relatively low short-term propensity to consume of 0.34, the saving ratio goes up by 0.7 percentage points in 2009. Part of the rise in private consumption is imported. Real GDP increases by 0.4 per cent in 2009 and a further 0.2 per cent in 2010.

As a consequence of the positive demand shock, the number of people in dependent active employment rises by a cumulated 10,900 from baseline, and the jobless rate decreases by 0.2 percentage points. Per capita wages in the private sector continue to increase moderately, therefore the higher wage bill is also in this case largely due to the creation of new jobs.

#### 4.3 *The role of multipliers*

The macroeconomic effects of a given fiscal policy measure are captured by multipliers, which quantify the impact of variations in government spending or taxes on GDP, employment, investment, private consumption, etc. In the focus of analyses studying the macroeconomic impact of fiscal policy are GDP multipliers. Their magnitude differs for different fiscal policy measures. Generally, the macroeconomic effect of increases in investment in public infrastructure is particularly strong since the respective measures have a direct impact and are relatively labor-intensive (particularly for the building of new structures). Moreover, the import content for construction investment is low. Cuts in income taxes have generally a more limited effect on growth than an increase in government spending, since they do not directly raise demand but rather personal disposable income. Like with most international or national macroeconomic models, the GDP multiplier is markedly higher for government expenditure than for cuts in direct taxes also in the WIFO model (Table 4). GDP increases only if the additional income is spent rapidly for purchases of domestically-produced consumer goods. Decisions on higher government expenditure will, however, exert their full effect only if the measures are implemented as planned.

Table 3

## Macroeconomic Effects of the Fiscal Stimulus Programmes

	Stimulus Packages I and II, Tax Reform <sup>(1)</sup>								Measures by Bund and Länder <sup>(1)</sup>		Stimulus Programmes of Main Trading Partners		Grand Total	
	Total		Infrastructure Investment		Increase in Private Disposable Income		Lowering of Corporate Financing Cost							
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
	<i>(percent of cumulated deviation from baseline)</i>													
<i>Aggregate demand, volume</i>														
Gross domestic product	+0.9	+1.0	+0.4	+0.3	+0.4	+0.6	+0.0	+0.1	+1.2	+1.4	+0.7	+0.8	+1.9	+2.1
Consumption	+0.8	+1.1	+0.1	+0.1	+0.7	+0.9	+0.0	+0.1	+0.9	+1.2	+0.1	+0.1	+1.0	+1.2
Private households	+1.0	+1.4	+0.1	+0.2	+0.8	+1.1	+0.0	+0.1	+1.0	+1.5	+0.2	+0.1	+1.2	+1.6
Government	+0.5	+0.3	+0.1	+0.0	+0.3	+0.3	+0.0	+0.0	+0.5	+0.4	± 0.0	± 0.0	+0.4	−0.0
Gross fixed investment	+3.1	+3.1	+2.0	+1.8	+0.7	+1.0	+0.4	+0.3	+5.1	+5.1	+0.7	+0.7	+5.7	+5.7
Equipment <sup>(2)</sup>	+2.4	+2.4	+0.8	+0.7	+1.0	+1.3	+0.5	+0.4	+3.1	+3.1	+1.1	+1.1	+4.1	+4.0
Construction	+3.8	+3.7	+3.0	+2.6	+0.5	+0.8	+0.3	+0.3	+6.7	+6.6	+0.4	+0.5	+7.0	+7.0
Exports	± 0.0	+0.1	± 0.0	+0.0	± 0.0	+0.0	± 0.0	+0.0	± 0.0	+0.1	+1.7	+1.8	+1.7	+1.9
Imports	+0.8	+1.0	+0.3	+0.3	+0.4	+0.6	+0.1	+0.1	+1.1	+1.2	+1.0	+0.9	+2.0	+2.1
Gross domestic product, nominal	+0.8	+1.1	+0.3	+0.4	+0.4	+0.6	+0.0	+0.1	+1.1	+1.5	+0.8	+1.2	+1.9	+2.6
Consumer prices	−0.1	+0.1	−0.0	+0.0	+0.0	+0.1	−0.0	+0.0	−0.1	+0.1	+0.2	+0.7	+0.1	+0.8

<i>Labour market and income</i>														
Dependent active employment <sup>(3)</sup>	+0.3	+0.6	+0.1	+0.2	+0.2	+0.3	+0.0	+0.0	+0.4	+0.8	+0.3	+0.5	+0.7	+1.3
1,000 persons	+10.7	+19.7	+4.7	+7.2	+5.4	+10.9	+0.6	+1.5	+14.7	+26.6	+9.1	+16.4	+23.5	+41.5
Labour supply	+0.1	+0.2	+0.0	+0.1	+0.1	+0.1	+0.0	+0.0	+0.2	+0.3	+0.1	+0.2	+0.2	+0.4
Unemployment rate in percent of dependent labour force <sup>(4)</sup>	-0.2	-0.3	-0.1	-0.1	-0.1	-0.2	-0.0	-0.0	-0.3	-0.5	-0.2	-0.3	-0.4	-0.7
Real wage per capita of dependent employees	+0.2	+0.3	+0.1	+0.1	+0.1	+0.2	+0.0	+0.0	+0.3	+0.4	+0.0	-0.0	+0.3	+0.4
Unit labour cost, private sector	-0.4	+0.0	-0.2	+0.1	-0.2	+0.0	-0.0	-0.0	-0.5	+0.1	-0.2	+0.4	-0.8	+0.5
Average labour productivity, private sector	+0.5	+0.4	+0.2	+0.1	+0.3	+0.2	+0.0	+0.0	+0.7	+0.5	+0.5	+0.3	+1.2	+0.7
Real disposable income, private households	+1.9	+2.1	+0.3	+0.2	+1.6	+1.6	+0.0	+0.2	+2.1	+2.2	+0.4	+0.1	+2.4	+2.3
<i>Government</i>														
Expenditure	-1.5	-1.3	+0.2	+0.3	-1.8	-1.4	+0.0	-0.2	-1.2	-0.9	+0.5	+1.1	-0.7	+0.2
Revenue	+0.5	+0.6	+0.3	+0.4	+0.1	+0.2	-0.0	-0.0	+1.2	+1.3	+0.0	+0.1	+1.2	+1.4
Government balance ( <i>percent of nominal GDP</i> )	-0.9	-0.9	-0.1	-0.0	-0.9	-0.8	+0.0	-0.1	-1.2	-1.0	+0.3	+0.5	-0.9	-0.5
Saving ratio ( <i>percent</i> )	+0.8	+0.6	+0.1	+0.0	+0.7	+0.4	+0.0	+0.1	+0.9	+0.6	+0.2	-0.0	+1.0	+0.6

Source: WIFO.

<sup>(1)</sup> Including subsidies and government consumption. – <sup>(2)</sup> Including immaterial investment, other equipment, industrial cattle and plants. – <sup>(3)</sup> Excluding early child care benefit recipients. – <sup>(4)</sup> Public Employment Service Austria.

Table 4

## Comparative Estimates of Fiscal Multipliers for Austria

	Government Expenditure		Wage and Income Tax	
	First Year	Second Year <sup>(1)</sup>	First Year	Second Year <sup>(1)</sup>
	Impact of 1 percent change on GDP (percent)			
OECD	0.70	1.10	0.20	0.60
OeNB	0.78	1.40	0.45	0.64
WIFO	1.19	1.31	0.40	0.56
IHS	0.96	0.98	0.29	0.41

Source: WIFO compilation.

<sup>(1)</sup> Cumulated.

The effectiveness of tax cuts to boost disposable income and thereby private purchasing power largely depends on the readiness of private households to increase consumption. The marginal propensity to consume is the change in consumption in response to a small variation in income. It is to an important extent determined by the overall economic environment. Sluggish income growth and heightened uncertainty may encourage precautionary saving and thus lead to a rise in the saving ratio (e.g., Bartzsch, 2006). The uncertainty about the effectiveness of fiscal measures, as reflected by GDP and employment multipliers, is higher at the present juncture than before the economic crisis or for “normal” cyclical variations. At the same time, however, various recent studies suggest that the impact of government spending may be higher in a severe recession with low/zero interest rates or a recession-induced liquidity trap.<sup>1</sup>

Furthermore, private households’ marginal propensity to consume differs substantially by income brackets. Low-income households typically have a higher consumption/lower saving propensity than higher-income earners. Tax cuts will thus have a stronger impact on growth and employment the more they benefit the lower income brackets.

A recent study by Oesterreichische Nationalbank (OeNB) arrives at somewhat higher cumulated multipliers than the present analysis (Köhler-Töglhofer and Reiss, 2009). For government expenditure, the OECD (2009, p. 138) assumes lower multipliers for Austria than those incorporated in the WIFO model. The fiscal multipliers in the LIMA model of the Institute for Advanced Studies (Hofer and Kunst, 2004; Berger *et al.*, 2009) are lower than the other multipliers presented in Table 4. In the WIFO model, the multiplier in the first year is markedly higher than in other models for Austria. Fiscal multipliers in the range between 1.0 and 1.2 are very common in national macroeconomic models. For example, a survey of a large number of national macroeconomic models provided in OECD (2009) quotes the average public consumption multiplier of 1.2 in the first year and 1.3 in the second year. The same survey reports the average multipliers for personal income tax cuts of 0.5 in the first year and 0.8 in the second year. The corresponding multiplier in the WIFO model is slightly lower.

<sup>1</sup> For a short overview of studies determining the multiplier in a liquidity trap see Erceg and Lindé (2010).

The multipliers presented here for Austria are derived from conventional demand-side oriented macroeconomic simulation models. The sizeable stimulus packages many countries have implemented to mitigate the economic downturn caused by the financial market crisis have intensified the academic discussion about the effectiveness of fiscal policy, which has been ongoing for the last two decades.<sup>2</sup> Meanwhile a number of empirical studies exist which are trying to quantify the multipliers for different fiscal policy measures for different countries and are yielding rather diverse results. These studies are mainly based on three types of models (Auerbach and Gale, 2009): (i) large-scale macroeconomic models with several equations for prices and quantities in different sectors of the economy which are trying to identify the impact of fiscal policy measures on these prices and quantities; (ii) structural vector autoregression (VAR) models identifying the macroeconomic effects of fiscal policy shocks; (iii) dynamic stochastic general equilibrium (DSGE) models using equations based on microeconomic theory. The different models used to estimate the magnitude of multipliers are one reason for the inconclusive results brought about by the existing body of literature. According to Freedman *et al.* (2009), further causes are country-specific differences in the marginal propensities to save and to import, in the responses of monetary policy, in financing constraints for the government, as well as in country size and degree of openness.

Table 5 gives an overview over the most important studies published since the beginning of 2009 inspired by the sizeable stimulus programs with which many countries reacted to the crisis. These studies try to identify the magnitude of the multipliers for various fiscal policy measures. Mostly public spending is in the focus, which is somewhat astonishing as tax measures were dominant in the majority of stimulus packages (OECD, 2009). Not surprisingly, the results for the fiscal multipliers vary considerably, depending on the models used. Generally, the more recent, neoclassical or New Keynesian models incorporating rational expectations and forward-looking behavior of firms and households and partly resting on microeconomic foundations produce smaller – and partly even negative – multipliers than the traditional macroeconomic Keynesian models, due to a crowding-out of private investment and consumption by public spending. It is important to note that all papers included in the following overview do not account for cross-border effects, *i.e.*, they only estimate the GDP multipliers for a given country resulting from its own fiscal actions, while leakages abroad or positive impulses from abroad are neglected.

Moreover, the studies reviewed here suggest that the multipliers:

- of spending measures are larger than of variations in taxes are larger in a situation with economic slack
- of contractionary and expansionary spending measures are very similar
- of spending measures are larger at low nominal interest rates or in a liquidity trap, respectively
- of spending measures are larger in traditional Keynesian models without forward-looking behavior of firms and households
- in conventional macroeconomic simulation models increase in the years after the policy shocks, while they tend to decrease in the more recent models
- vary inversely with the degree of openness of the countries regarded.

#### 4.4 Cyclical stimulus from abroad

Particularly in Europe, one issue heavily debated was the necessity of international coordination of national stimulus programs to reinforce their effectiveness given the deep economic

<sup>2</sup> For brief reviews of the most important earlier studies (since 2002) see Giordano *et al.* (2007), Afonso and Sousa (2009) and Christiano *et al.* (2009).

Table 5

## Recent Studies on the Size of Multipliers for Various Fiscal Policy Measures

Authors	Sample	Fiscal Policy Measure	Magnitude of GDP Multiplier	Specific Aspects
Barro and Redlick (2009)	US 1917 to 2006	increase in defense spending	0.6 to 0.7 for median unemployment rates 1.0 for high unemployment rates	multipliers depend positively on extent of economic slack spending multipliers smaller than tax multipliers
	US 1950 to 2006	increase in income tax	−1.1	multipliers for spending increases and decreases very close
Cogan <i>et al.</i> (2009)	US 2009 to 2012	permanent increase in government purchases	0.4	temporary increase: multiplier turns negative
Cwik and Wieland (2009)	11 largest Euro area countries 2009/10	increase in government spending in forward-looking models	−0.26 to 0.04 short-term −0.455 to −0.11 medium-term	multipliers much larger in traditional macroeconomic model without forward-looking behavior
		increase in government spending in non-forward-looking models	0.37 short-term −0.18 medium-term	
Fair (2009)	US	increase in government purchases	2.0	-
		decrease of personal income tax	1.0	
		increase in transfer payments to households	1.0	
Hall (2009)	US	increase in government purchases	0.7 to 1.0 1.7 at low interest rate	spending multipliers higher with zero nominal interest rate
Ramey (2009)	US	increase in government spending	0.6 to 1.1	-
Romer and Bernstein (2009)	US 2009 to 2012	permanent increase in government purchases	1.6	-
		permanent tax cuts	1.0	
OECD (2009)	Review of macroeconomic simulation models for various OECD countries and Euro area	increase in government purchases	1.2 to 1.3	multipliers vary inversely with degree of openness
		corporate tax cut	0.3 to 0.5	
		personal income tax cut	0.5 to 0.8	
		indirect tax cut	0.2 to 0.4	
		social security contribution cut	0.3 to 0.6	

Source: Own compilation.

<sup>(1)</sup> Mean values; first and second year multipliers.

integration of national economies. To avoid leakages and thus to reinforce the effectiveness of domestic fiscal measures, and to respond adequately on a global/European level to the global/European crisis, supranational bodies – in particular the IMF and the European Commission – strongly advocated internationally coordinated stimulus measures. Few studies, however, exist to date on the extent of the cross-border impact of fiscal policy. IMF economists themselves (Freedman *et al.*, 2009) undertook simulations with the IMF's Global Integrated Monetary and Fiscal Model (GIMF) to assess the size of GDP multipliers for a global fiscal stimulus, differentiating for a situation with and without monetary accommodation. Not surprisingly, multipliers are considerably higher with monetary accommodation, and there are significant cross-border spillovers. These findings are corroborated by simulations done by the OECD (2009) and by Corsetti, Meier and Müller (2009) who show in addition that cross-border spillovers are particularly large when a credible medium-term consolidation regime is announced simultaneously.

Besides estimating the macroeconomic effects of the domestic stimulus measures on the Austrian economy, the present study also quantifies the impact of stimulus packages adopted by Austria's main trading partner countries on the domestic economy. Therefore the increase in Austria's foreign markets has been estimated using the OEF model. For this purpose, the tax-related measures have been taken into account to the same degree of detail as presented in OECD (2009). The additional government expenditure has entirely been counted as public consumption. Such simplification is deemed warranted since in the OEF model the GDP and employment multipliers are of similar magnitude for public investment and consumption. Both aggregates exhibit rather low import content in comparison with other demand components.

Table 6 shows the impact of fiscal stimulus programs on real GDP of Austria's main trading partners and Japan.<sup>3</sup> Weighted by the each country's export share in Austria's overall exports, demand on Austria's foreign markets is boosted from baseline by 0.8 per cent each for 2009 and 2010.

The spillover effect on the Austrian economy is estimated using the WIFO macroeconomic model (Table 3). The increase in demand abroad leads to a cumulated gain in Austria's exports by 1.8 per cent from baseline in 2010. The higher exports trigger a positive income effect leading to an increase in private consumption and investment mostly in 2009. As imports will rise at the same time, the gain in real GDP is 0.8 per cent from the baseline. These transmission effects are consistent with simulation results in OECD (2009, p. 133) for the euro area where a fiscal impulse of the order of 1 per cent of GDP in all industrialized countries lifts euro area real GDP by 0.76 per cent, of which 0.24 percentage points are due to transmission effects from abroad.

Table 7 summarizes the respective size as well as GDP and employment effects of the measures taken by the federal government and the Länder and of the stimulus programs adopted by Austria's main trading partners.

## 5 Concluding remarks

Model simulations suggest that the fiscal stimulus measures implemented in Austria may have dampened the downturn by a cumulated 2.1 per cent of GDP in 2009 and 2010. Almost half of the fiscal impulse is generated by the fiscal packages I and II and the tax cuts introduced at the federal level, 0.4 percentage points by measures taken by the Länder and 0.8 percentage points by the stimulus programs implemented by Austria's main trading partners. The total impact on GDP secures 41,500 jobs and holds the rise of the unemployment rate by 0.7 percentage points (in each

<sup>3</sup> Japan's fiscal package has been included in order to illustrate more explicitly its effect on the euro/yen exchange rate.

Table 6

## Impact of Stimulus Programs Adopted by Austria's Major Trading Partners

	Percentage Share in Austrian Exports 2007	Gross Domestic Product ( <i>volume</i> )		
		2008	2009	2010
		Cumulated Deviation from Baseline ( <i>percent</i> )		
Germany	30.0	+0.1	+0.9	+1.0
Italy	8.9	± 0.0	± 0.0	− 0.3
USA	5.0	+0.6	+2.3	+3.6
Switzerland	3.9	+0.1	+0.5	+0.1
France	3.6	± 0.0	+0.2	− 0.2
Czech Republic	3.6	± 0.0	+0.8	+0.6
UK	3.5	+0.1	+0.4	− 0.4
Hungary	3.5	± 0.0	− 0.5	− 1.0
Spain	2.9	+0.8	+1.2	+0.5
Poland	2.6	± 0.0	+0.7	+0.3
Japan	1.0	± 0.0	+0.8	+0.1
Other countries	31.4	+0.2	+1.0	+1.2
Export markets total <sup>(1)</sup>		+0.2	+0.8	+0.8

Source: OECD, WIFO.

<sup>(1)</sup> Impact on GDP, weighted by Austrian export shares.

Table 7

## Overall Economic Effects of Stimulus Measures by Category

Item	Size <sup>(1)</sup>		Deviation from Baseline <sup>(1)</sup>	
			GDP ( <i>volume</i> )	Dependent Active
	( <i>millions of euros</i> )	( <i>percent of 2008 GDP</i> )	( <i>percent</i> )	( <i>persons</i> )
<i>Total</i>		4.2	+2.1	41,500
Measures by Bund and Länder	11,918.4	4.2	+1.4	26,600
Infrastructure investment	1,435	0.5	+0.3	7,200
Lowering of corporate financing cost	2,080	0.7	+0.1	1,500
Increase in private disposable income	5,952.5	2.1	+0.6	10,900
Measures taken by the Länder	2,080.9	0.7	+0.4	6,900
Stimulus programmes of main trading partners			+0.8	16,400

Source: WIFO.

<sup>(1)</sup> Cumulated over 2009 and 2010.



case from a baseline without government measures). Inflation picks up moderately. According to the simulations, the federal government balance weakens in 2010 by an amount of 0.5 per cent of GDP.

Infrastructure investment at the federal level raises GDP by 0.3 per cent and employment in 2010 by a cumulated 7,200 persons. The measures to lower corporate financing cost boost GDP by 0.1 per cent and employment in 2010 by a cumulated 1,500.

The *ex ante* simulation results rest on the assumption of the measures decided being fully implemented in 2009 and 2010. In addition, some measures - such as the introduction of a compulsory pre-school year free of charge - and the active employment policy in general have a direct positive impact on employment which cannot be captured by the kind of models used. Hence, the results presented here should be taken as the lower limit of the overall employment effects generated by the fiscal stimulus programs. A more precise estimate of these effects would require a more sophisticated analysis.

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# GETTING IT RIGHT: HOW FISCAL RESPONSE CAN SHORTEN CRISIS LENGTH AND RAISE GROWTH

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## 1 Introduction

Fiscal measures, such as tax cuts and spending increases, have been central to government responses to the recent global financial crisis. All countries in the Group of Twenty (G-20) have adopted discretionary fiscal packages to fight the economic downturn that was set off in mid-2007 by a financial and banking crisis with roots in the U.S. mortgage market. Those programs, enacted specifically to boost aggregate demand during the economic downturn, cost about 2 per cent of the gross domestic product (GDP) of the G-20 countries in 2009 and are projected at 1.6 per cent of GDP in 2010 (IMF, 2009).

These expansionary fiscal policies are beginning to offset the fall in private demand in G-20 countries, but it is too early to tell if they will help shorten the duration of the recession and promote growth in the medium term. Does it matter for the next three to five years whether governments rely on tax cuts or spending increases to combat the recession? Or whether governments cut consumption taxes or income taxes or spend on current consumption or investment? We examine these questions, using historical data from past banking crises, which have caused more severe and protracted recessions than those with their roots in the real economy.

## 2 Fiscal balances deteriorate

The discretionary programs enacted to combat the global recession contributed to increased government deficits. In addition, declining economic activity and a drop in asset values both lowered government revenues and increased spending for existing social programs, such as unemployment insurance. On average, fiscal balances in the G-20 nations are projected to deteriorate by about 7 per cent of GDP in 2009, compared to the pre-crisis periods. The discretionary measures account for almost half of the increase in deficits. Discretionary fiscal stimulus was larger in emerging market economies, which have limited social programs and lower revenues. By contrast, in advanced G-20 countries, the bigger deficits were mainly caused by automatic increases in spending on such existing social programs as unemployment insurance and social assistance.

Most of the fiscal stimulus has centered on raising public spending. More than two-thirds of the discretionary stimulus came in spending measures in 2009, with the rest in tax cuts. Investment in infrastructure accounts for almost half of the stimulus in emerging G-20 countries, compared to about one-fifth in advanced G-20 countries. Tax reductions, notably corporate and personal income taxes, are a significant share of fiscal stimulus in advanced economies.

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The usual disclaimer applies.

### 3 Recessions and fiscal policy

The role of fiscal and monetary policy during recessions has been studied extensively. Fiscal and monetary policies counter the effects of shrinking output during recessions, credit contractions and asset price declines (Claessens, Kose and Terrones, 2008). Fiscal policy appears to be particularly effective in shortening the duration of recessions. That suggests that an aggressive countercyclical fiscal stance – one that leans against the direction in which the economy is moving by cutting taxes or increasing spending – is appropriate during recessions and that fiscal stimulus should be large, sufficiently lasting, diversified, contingent, collective and sustainable (Spilimbergo *et al.*, 2008). However, there is little evidence on the effectiveness of fiscal policy during periods of systemic banking crises. This has limited our understanding of how the current stimulus packages will affect the duration of the crisis.

Several factors could hamper the effectiveness of fiscal expansion during the more severe and long-lasting recessions caused by financial crises:

- The dramatic drop in aggregate demand necessitates a larger fiscal stimulus to support the economy than in a standard recession.
- The implementation of fiscal policy is made difficult because the ability of consumers to spend is hampered by financial distress. This causes capital markets to freeze, limiting the scope for private consumers to access credit against the backdrop of severe income losses.
- Governments find it difficult to finance fiscal expansions in a more risk-averse global environment. While this can be particularly important for countries with high initial levels of debt or high credit risk, the across-the-board increase in the perception that it is riskier to lend to governments can affect sovereign bond issuance even in better-rated economies. However, this effect can be offset in part by lower inflationary pressures and financial markets' flight to quality.

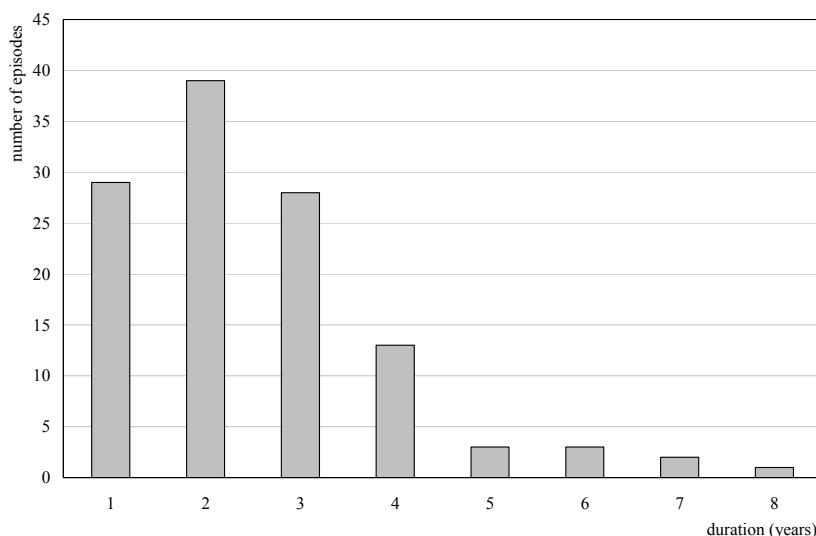
### 4 Systemic banking crisis and fiscal policy

We used new data on financial crisis episodes compiled by Laeven and Valencia (2008) to study the effectiveness of fiscal policy under systematic banking crises. This database comprises 118 episodes of financial crises that occurred in 99 countries during the period 1980-2008. These crises were different from standard recessions as they originated from severe systemic disruptions in the banking system. Under Laeven and Valencia definition, systemic banking crisis occurs when a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face difficulties repaying loans on time. They identify 124 systemic banking crises over the period 1970-2007, and estimate that fiscal costs net of recoveries associated with these crises average about 13.3 per cent of GDP while output losses average 20 per cent of GDP.<sup>1, 2, 3</sup>

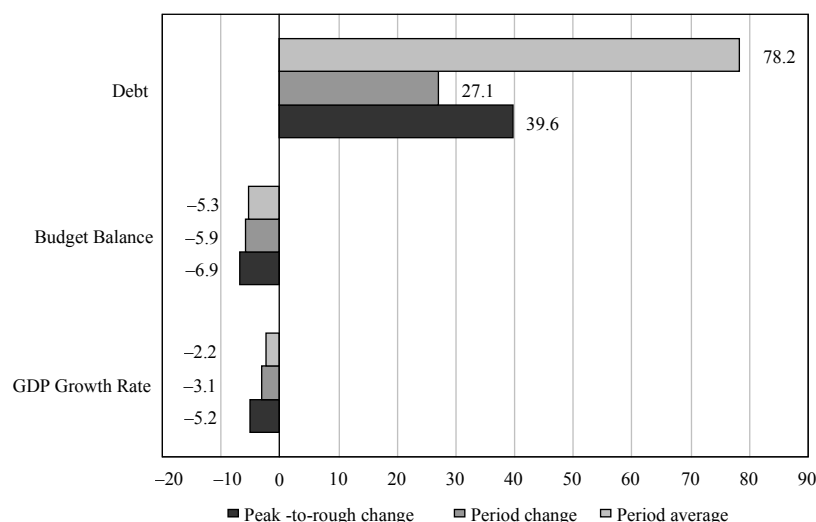
<sup>1</sup> We use the dataset of 124 banking crises and drop 10 of them due to lack of fiscal data. We come up with a sample of 118 cases by adding 4 cases from their other two datasets. These cases were originally classified as other type of financial crisis (currency crisis and debt crisis), but they triggered a banking crisis.

<sup>2</sup> We complement Laven and Valencia's database with additional data from the World Economic Outlook, the Government Financial Statistics, and the Global Financial Database.

<sup>3</sup> This approach differs from the one recently adopted by Reinhart and Rogoff (2009) who define banking crises as two types of events: bank runs that lead to the closure, merger, or takeover by the public sector of one or more financial institutions; and if there are no runs, the closure, merger, takeover, or large-scale government assistance for an important financial institution that marks the start of a string of similar outcomes for other financial institutions. With these criteria, they identify 66 cases that occurred between 1945 and 2007.

**Figure 1****Frequency and Duration of Banking Crises**

Source: Author's calculations.

**Figure 2****Economic Consequences of Banking Crises**  
(percent of GDP)

Source: Author's calculations.

Note: Peak-to-rough values are differences between the worst level reached by the variables during the crisis and their pre-crisis value. Period changes denote differences between the last year of the crisis and the pre-crisis year. Period averages show the average value of the variable during the crisis episodes.

Financial crises lasted on average for 2.5 years (Figure 1), with 85 per cent of the episodes lasting between one and four years. One episode, the longest, lasted eight years. These crises also generated large economic costs. Peak-to-trough fall in GDP growth was more than 5 percentage points during the average shock episode. The effects of crises on fiscal aggregates were also significant: during the crisis, public debt increased by about 30 percentage points of GDP (Figure 2) reflecting a significant deterioration in the primary fiscal balance. A drop in revenue collection as well as higher public expenditure contributed to the fiscal deterioration. These results are similar to the estimated impact of the current crisis on output and government debt in G-20 countries and to those reported in other studies on financial crises (Reinhardt and Rogoff, 2009).

To assess the behavior of fiscal variables during crises episodes and in their aftermath, we calculate the overall change in the variables two years prior to the start of the crisis;<sup>4</sup> during the crisis; and in the two years after the crisis. Results are expressed as a percent of GDP (Tables 1 to 3).

<sup>4</sup> As fiscal variables, in particular revenue, may be affected by asset value increase in the run up to the crisis we also estimated the change over a longer time period.

Table 1

**Fiscal Aggregates**  
(percent of GDP)

Item	Before Crisis ( $t-2$ ; $t-1$ )	During Crisis ( $t$ )	After Crisis ( $t+1$ ; $t+2$ )
Debt	-9.2	27.1	-7.2
Budget balance	-0.1	-5.9	1.5
Primary budget balance	0.3	-4.9	2.8
Total revenues	0.8	-3.7	4.9
Total expenditures	0.9	2.3	2.6

Table 2

**Budget Composition: Revenues**  
(percent of GDP)

Item	Before Crisis ( $t-2$ ; $t-1$ )	During Crisis ( $t$ )	After Crisis ( $t+1$ ; $t+2$ )
Taxes	0.5	-2.3	4.2
Income, profits, capital gains	0.2	-1.2	3.8
Payroll and workforce	0.1	-0.3	0.0
Property	0.0	0.0	0.0
Goods and services	0.1	-0.5	0.4
International trade	0.1	-0.3	0.0
Other taxes	0.0	0.1	-0.1
Social contributions	0.2	-1.2	0.2
Other revenues	0.1	-0.2	0.5

Table 3

**Budget Composition: Expenditures**  
(percent of GDP)

Item	Before Crisis ( $t-2$ ; $t-1$ )	During Crisis ( $t$ )	After Crisis ( $t+1$ ; $t+2$ )
Current expenditure	-0.9	2.2	0.1
Goods and services	-0.1	0.6	-0.5
Employee compensation	0.1	0.2	0.1
Transfers	0.1	0.6	0.3
Interest payments	0.4	1.0	2.3
Other expenses	0.4	-0.2	-0.1
Public Investment	0.0	0.1	2.5

For the three tables above:

Source: Author's calculations based on data from WEO and GFS.

Note: Figures in ( $t$ ) show the change in the variables between the last year of the crisis period and the pre-crisis year. Figures in ( $t-2$ ;  $t-1$ ) show the change in the variables during the two years prior to the start of the crisis. Figures in ( $t+1$ ;  $t+2$ ) show the change in the variables during the two years following the last year of the crisis.



During banking crises, fiscal deficits increased by more than 2 per cent of GDP per year and public debt worsened by about one-third of the preexisting average debt level of about 80 per cent of GDP. Total revenues fell by about 3.5 percentage points of GDP and government expenditures rose by more than 2 percentage points of GDP. Tax revenue fell by more than 2 per cent of GDP, especially from income and profits taxes (Table 2). Social contributions also fell considerably. After the crisis, revenue collection improved, in particular taxes associated improvement in private income. There was also a significant increase in current expenditure (Table 3). Interest payments, transfers and government's purchase of goods rose most. The rise in public sector salaries was weaker and public investment remained stable during the shock, but rose after the crisis.

Did fiscal expansion help in shortening the length of financial crises? Our results based on regression analysis of the factors that affected crisis duration indicate that it did. We use a dummy-variable indicator of large fiscal expansions during the crisis episode to capture major changes in fiscal policy. We create an "expansionary fiscal policy" dummy that takes value equal to 1 if the budget balance worsens by more than 1.5 per cent of GDP in the first three years following the onset of the crisis. The following model is used to determine the effect of fiscal policy and other accompanying measures on the duration of banking crises:

$$\text{Duration}(t) = \alpha + \beta_1 \text{FiscalExpansion}_t + \beta_2 \text{CreditBoom}_{t-1} + \beta_3 \text{Containment}(\text{Dep.Guarantee})_t + \beta_4 \text{Resolution}(\text{N.BanksClosed})_t + \beta_5 \text{Resolution}(\text{GovtIntervention})_t + \varepsilon_t \quad (1)$$

where  $t$  refers to the time period during the crisis and  $t-1$  refers to the year preceding the onset of the crisis. *Expansion* is the indicator of fiscal expansion; *Credit Boom* is a dummy variable that takes value equal to 1, when the banking crises was preceded by an abnormal expansion of credit; and *Guarantee* is a dummy variable that takes value equal to 1 when there was a freeze of deposits and/or a blanket guarantee in the first phases of banking crises. We include two measures of resolution policies, captured by the total *Number of Banks Closed* during the episode and the degree of *Government Intervention* in the financial sector.<sup>5</sup>

We estimate a baseline model in a truncated sample of 118 episodes of banking crises, using OLS and Ordered Logit. Results are reported in Table 4 and show that fiscal expansions are a decisive factor for reducing the duration of banking crises. Higher government spending and lower taxes boosted aggregate demand by replacing falling private consumption. Public investment also contributed to offsetting the collapse in private investment. Higher deficits led to shorter crisis durations in our sample. An increase of 1 percent of GDP in the fiscal deficit reduced the duration of the crisis by almost two months. This suggests that fiscal expansion of the size similar to the one adopted on average by G-20 countries during the current global financial crisis may cut the length of the recession by almost one year, compared to a baseline situation in which the budget deficits remained the same as in the pre-crisis period.

## 5 Fiscal policy composition

We also find that the composition of fiscal expansion – how it is distributed as current spending, investment spending, or tax cuts – matters (Table 5). Higher public consumption – government purchases of goods and services and wages – and lower income taxes shorten the duration of financial crises. For example, a 10 per cent increase in the share of public consumption in the budget reduced the crisis length by three to four months more than would have larger fiscal deficits alone. The same cannot be said for capital expenditures. Why? We believe that implementing capital projects generally takes longer than directly injecting demand through

<sup>5</sup> See Laeven and Valencia (2008) for the derivation of these variables.

Table 4

**Fiscal Policy, Resolution Policies and Crisis Length**

Item	Duration (OLS)		Duration (Ord.Logit)	
	Model 1	Model 2	Model 3	Model 4
Budget Balance ( <i>percent of GDP</i> )	0.072*** (3.73)	- -	0.122*** (3.22)	- -
Expansionary fiscal policy	- -	-0.626*** (-2.86)	- -	-1.023*** (-2.62)
Previous credit boom	0.690*** (3.40)	0.637*** (3.04)	1.036*** (2.82)	0.927** (2.53)
Deposit freeze or guarantee	-0.522** (-2.53)	-0.610*** (-2.94)	-0.814** (-2.25)	-0.806** (-2.23)
Number of banks closed	-0.168*** (-3.53)	-0.165*** (-3.37)	-0.519*** (-4.91)	-0.496*** (-4.72)
Government intervention	-0.721*** (-3.52)	-0.825*** (-3.94)	-1.207*** (-3.12)	-1.329*** (-3.46)
Constant	3.514*** (14.76)	3.876*** (14.31)	- -	- -
Observations	118	118	118	118
Adj. R-squared / Pseudo R-squared	0.435	0.407	0.211	0.198

\*\*\* significant at 1 percent; \*\* significant at 5 per cent; \* significant at 10 per cent.

Dependent variable: length of banking crisis.

Source: Authors' estimates.

government purchases of goods and services. This picture seems consistent with the pace of disbursement of current fiscal packages. Tax cuts and increases in government consumption and transfers were implemented rapidly in many G-20 economies. However, procedures for budget allocation, transfers to subnational governments, procurement and payments to contractors slowed down the disbursement of some capital projects (Horton, Kumar and Mauro, 2009).

The composition of tax measures is also important: cutting consumption taxes was more effective than cutting income taxes. That is because cuts in levies such as a value added or sales taxes quickly stimulate private consumption while income tax reductions can in part be saved. Consumption tax cuts help support domestic demand particularly when dropping asset values, income losses and rising unemployment dent households' ability to spend.

Other factors played a significant role. Crises that were preceded by a credit boom tended to last longer. Those in which a guarantee for bank deposits was provided (or expanded) by the government were shorter than crises in which governments did not provide this financial safety net. Closing failed banks and a strong government intervention in financial markets was also beneficial to resolving crises in the last three decades.

The analysis also found that how fiscal expansion is constructed affects whether it creates conditions that promote economic growth five years after a crisis (Table 6). Fiscal responses that had a greater share of public investment may not have helped shorten the recessions as much as

Table 5

## Fiscal Policy Composition, Resolution Policies and Crisis Length

Item	Duration of Crisis (OLS)				Duration of Crisis (Ord. Logit)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	−0.522** (−2.45)	−0.572** (−2.61)	−0.581** (−2.74)	−0.601** (−2.85)	−0.945** (−2.41)	−0.974** (−2.48)	−0.937** (−2.39)	−1.049** (−2.67)
Public consumption ( <i>percent of total expenditures</i> )	−0.035*** (−3.12)				−0.041** (−2.11)			
Public investment ( <i>percent of total expenditures</i> )		−0.027* (−1.82)				−0.027 (−1.13)		
Income tax revenue ( <i>percent of total revenues</i> )			0.076*** (3.07)				0.111** (2.31)	
Goods & services tax revenue ( <i>percent of total revenues</i> )				0.119*** (3.19)				0.180** (2.71)
Previous credit boom	0.568** (2.80)	0.621** (2.99)	0.590** (2.91)	0.592** (2.93)	0.874** (2.37)	0.936** (2.55)	0.927** (2.51)	0.960** (2.58)
Deposit freeze or guarantee	−0.555** (−2.76)	−0.563** (−2.72)	−0.461** (−2.24)	−0.568** (−2.84)	−0.782** (−2.16)	−0.752** (−2.06)	−0.664* (−1.81)	−0.803** (−2.20)
Number of banks closed	−0.137** (2.86)	−0.152*** (−3.09)	−0.143** (−2.99)	−0.135** (−2.82)	−0.459*** (−4.31)	−0.480*** (−4.54)	−0.449*** (−4.24)	−0.440*** (−4.15)
Government intervention	−0.713*** (−3.48)	−0.781*** (−3.74)	−0.841*** (−4.16)	−0.837*** (−4.16)	−1.244*** (−3.21)	−1.304*** (−3.38)	−1.386*** (−3.56)	1.408*** (−3.61)
Constant	3.737*** (14.12)	3.854*** (14.36)	3.917*** (14.98)	3.731*** (14.12)				
Observations	118	118	118	118	118	118	118	118
Adj. <i>R</i> -squared / Pseudo <i>R</i> -squared	0.451	0.419	0.449	0.452	0.211	0.202	0.213	0.219

\*\*\* significant at 1 percent; \*\* significant at 5 per cent; \* significant at 10 per cent.

Dependent variable: length of banking crisis.

Table 6

## Fiscal Policy Composition, Resolution Policies and Post-crisis Growth

Item	Average Growth ( $t-t+5$ ) OLS				Average Growth ( $t-t+5$ ) (Robust)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	0.262 (0.38)	0.251 (0.40)	0.144 (0.21)	0.218 (0.34)	0.262 (0.39)	0.251 (0.45)	0.144 (0.2)	0.218 (0.36)
Public consumption ( <i>percent of total expenditures</i> )	-0.010 (-0.28)				-0.010 (-0.36)			
Public investment ( <i>percent of total expenditures</i> )		0.229*** (4.94)				0.229*** (4.98)		
Income tax revenue ( <i>percent of total revenues</i> )			-0.177** (-2.20)				-0.177** (-2.48)	
Goods & services tax revenue ( <i>percent of total revenues</i> )				0.402*** (3.44)				0.402*** (3.57)
Previous credit boom	0.033 (0.05)	0.242 (0.40)	0.183 (0.28)	-0.101 (-0.16)	0.033 (0.05)	0.242 (0.45)	0.183 (0.30)	-0.101 (-0.17)
Deposit freeze or guarantee	1.413** (2.18)	0.895 (1.47)	1.030 (1.54)	1.529** (2.42)	1.413** (2.19)	0.895 (1.68)	1.030 (1.62)	1.529** (2.51)
Number of banks closed	0.181 (1.15)	0.094 (0.67)	0.129 (0.84)	0.279* (1.85)	0.181 (1.49)	0.094 (0.93)	0.129 (1.07)	0.279** (2.45)
Government intervention	0.450 (0.67)	-0.004 (0.01)	0.449 (0.69)	0.353 (0.56)	0.450 (0.67)	-0.004 (0.01)	0.449 (0.71)	0.353 (0.58)
Private investment ( <i>percent of total investment</i> )	7.530** (2.50)	4.803* (1.75)	7.220** (2.47)	6.557* (2.31)	7.530** (2.76)	4.803** (2.14)	7.220*** (2.87)	6.557*** (3.14)
Cost of financing (a)	-0.121*** (-2.87)	-0.074** (-1.95)	-0.109** (-2.71)	-0.122*** (-3.13)	-0.121** (-1.81)	-0.074 (-1.20)	-0.109** (-1.71)	-0.122** (-1.99)
Fresh capital injections into financial sector	1.453** (2.18)	0.866 (1.43)	1.246** (1.92)	1.415** (2.27)	1.453** (2.02)	0.866 (1.52)	1.246** (1.91)	1.415** (2.22)
Constant	1.486 (1.57)	2.145** (2.56)	1.541* (1.71)	1.149 (1.31)	1.486 (1.44)	2.145** (2.44)	1.541* (1.60)	1.149 (1.25)
Observations	118	118	118	118	118	118	118	118
Adj. R-squared	0.142	0.299	0.178	0.226	0.208	0.353	0.241	0.286

\*\*\* significant at 1 percent; \*\* significant at 5 per cent; \* significant at 10 per cent.

Dependent variable: average GDP growth in the 5 years following the end of the crisis.

Note (a): the cost of financing variable is the difference between the lending interest rates and the interbank interest rates.

Source: authors' estimates.

consumption spending but had a positive effect on output growth in the medium term. A 1 percent increase in the share of capital outlays in the budget raised post-crisis growth by about 1/3 of 1 percent per year in our regression analysis of crisis episodes. It appears that capital investment promotes medium-term growth by removing infrastructure bottlenecks and by enhancing private sector competitiveness. Income tax reductions were also associated with positive growth effects. Trimming income taxes removed distortions that hurt long-run economic performance.

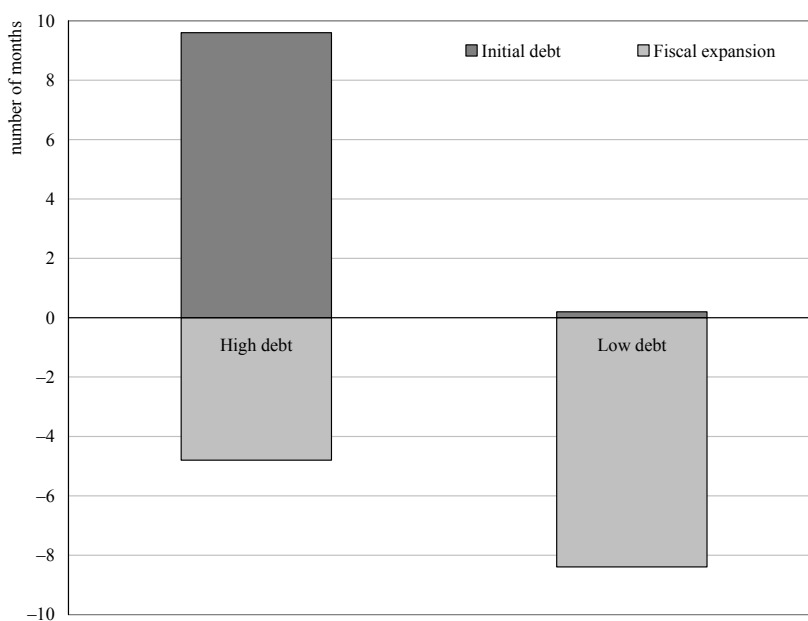
These results highlight the potential trade off between fiscal policy's role in supporting aggregate demand in the short term and its contribution to productivity growth in the medium term. They point to the need to evaluate the composition of fiscal stimulus packages before their implementation, as different short-term and medium-term fiscal multipliers can affect fiscal policy performance during the crisis and in its aftermath.

## 6 Fiscal policy and debt sustainability

However, insufficient fiscal space – that is, the capacity to spend more – and concerns about the sustainability of public debt along with low initial per capita income can limit the effectiveness of fiscal expansions during crises (Tables 7-10). The lack of fiscal space in countries with high public sector debt-to-GDP ratios before the crisis not only constrains the government's ability to implement countercyclical policies, but also undermines the effectiveness of fiscal stimulus and the quality of fiscal performance. For example, in countries with relatively high debt, crises lasted almost one year longer; the beneficial effects of fiscal expansions were negated by the high public debt. Our simulation (Figure 3) shows that high initial levels of public debt make it more difficult to exit a crisis and also limit the ability of expansionary fiscal policy to support output growth.

**Figure 3**

### Impact of Fiscal Expansions on Crisis Length by Level of Debt



Source: Author's calculations.

Similar results are found for countries with lower per capita income, because those nations' limited fiscal space, lower technical capacity to implement fiscal stimulus plans and higher exposure to macroeconomic risks, including to external shocks, reduce the scope and the effects of fiscal expansions during crises.

## 7 Robustness

The robustness of the above results has been assessed to control for alternative definitions of crisis' length, index of discretionary fiscal policy and endogeneity. In the baseline model, the

Table 7

## Explaining Crisis Length Controlling for Initial Fiscal Conditions

Item	Duration of Crisis (OLS)			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	−0.676** (−2.20)	−0.907*** (−2.92)	−0.791** (−2.55)	−0.947*** (−3.13)
Expansionary fiscal policy* Highly Indebted ( <i>t</i> −1)	0.273 (0.66)	0.564 (1.33)	0.397 (0.95)	0.522 (1.26)
Public consumption ( <i>percent of total expenditure</i> )	−0.055*** (−3.22)			
Public consumption* Highly Indebted ( <i>t</i> −1)	0.019 (0.84)			
Public investment ( <i>percent of total expenditure</i> )		−0.029* (1.91)		
Public Investment* Highly Indebted ( <i>t</i> −1)		−0.010 (−0.34)		
Income tax revenue ( <i>percent of total revenues</i> )			0.110** (2.72)	
Income tax revenue* Highly Indebted ( <i>t</i> −1)			−0.064 (−1.26)	
Goods & services tax revenue ( <i>percent of total revenues</i> )				0.090* (1.88)
Goods & services tax revenue * Highly Indebted ( <i>t</i> −1)				0.057 (0.71)
Previous Credit boom	0.420** (2.03)	0.549** (2.60)	0.531** (2.53)	0.504** (2.42)
Deposit freeze or guarantee	−0.628*** (−3.15)	−0.619*** (−2.93)	−0.559*** (−2.63)	−0.651*** (−3.15)
Number of banks closed	−0.145*** (−3.10)	−0.162*** (3.31)	−0.157*** (−3.28)	−0.145*** (2.96)
Government intervention	−0.737*** (3.62)	−0.801*** (−3.78)	−0.876*** (−4.25)	−0.896*** (−4.33)
Highly Indebted ( <i>t</i> −1)	0.798** (2.52)	0.837** (2.48)	0.844*** (2.54)	0.672** (1.99)
Constant	3.877*** (11.17)	3.907*** (10.86)	3.932*** (11.12)	3.843*** (11.15)
Observations	118	118	118	118
Adj. <i>R</i> -squared	0.503	0.453	0.475	0.471

Table 8

## Explaining Crisis Length Controlling for Initial Economic Conditions

Item	Duration of Crisis (OLS)			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	-0.676** (-2.20)	-0.907*** (-2.92)	-0.791** (-2.55)	-0.947*** (-3.13)
Expansionary fiscal policy* High GDP per Capita ( $t-1$ )	-0.876** (-2.39)	-0.805*** (-3.12)	-0.881*** (-2.99)	-0.987*** (-3.63)
Public consumption (percent of total expenditure)	-0.075*** (-3.42)			
Public consumption* High GDP per Capita ( $t-1$ )	0.122*** (4.84)			
Public investment (percent of total expenditure)		-0.129* (1.92)		
Public Investment* High GDP per Capita ( $t-1$ )		-0.210*** (-2.94)		
Income tax revenue (percent of total revenues)			0.122** (2.72)	
Income tax revenue* High GDP per Capita ( $t-1$ )			-0.264*** (-3.26)	
Goods & services tax revenue (percent of total revenues)				0.190* (1.98)
Goods & services tax revenue * High GDP per Capita ( $t-1$ )				0.157** (2.71)
Previous Credit boom	0.411** (2.33)	0.439** (2.60)	0.331** (2.63)	0.404** (2.32)
Deposit freeze or guarantee	-0.618*** (-3.15)	-0.619*** (-3.02)	-0.629*** (-3.63)	-0.621*** (-3.45)
Number of banks closed	-0.155*** (-3.14)	-0.156*** (3.39)	-0.158*** (-3.29)	-0.155*** (2.97)
Government intervention	-0.707*** (3.63)	-0.802*** (-3.79)	-0.872*** (-4.15)	-0.825*** (-4.13)
High GDP per capita ( $t-1$ )	-0.345*** (-3.02)	-0.322*** (-4.07)	-0.455*** (-4.19)	-0.667*** (-4.31)
Constant	3.017*** (11.87)	3.008*** (11.86)	3.032*** (11.02)	3.033*** (11.22)
Observations	118	118	118	118
Adj. $R$ -squared	0.501	0.471	0.462	0.485

Table 9

## Explaining Post-Crisis Growth Controlling for Initial Fiscal Conditions

Item	Average Growth ( $t-t+5$ ) (OLS)			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	0.363 (0.44)	0.563 (0.86)	0.032 (0.14)	0.201 (0.29)
Expansionary fiscal policy* Highly Indebted ( $t-1$ )	-0.845 (-0.76)	-0.042 (-0.05)	-0.448 (-0.43)	-0.772 (-0.81)
Public consumption ( <i>percent of total expenditure</i> )	(-0.020) (-0.42)			
Public consumption* Highly Indebted ( $t-1$ )	0.017 (0.27)			
Public investment ( <i>percent of total expenditure</i> )		0.259*** (5.94)		
Public Investment* Highly Indebted ( $t-1$ )		-0.071 (-1.02)		
Income tax revenue ( <i>percent of total revenue</i> )			-0.237** (-2.28)	
Income tax revenue* Highly Indebted ( $t-1$ )			0.028 (0.22)	
Goods & services tax revenue ( <i>percent of total revenue</i> )				0.558*** (4.94)
Goods & services tax revenue * Highly Indebted ( $t-1$ )				-0.407** (2.07)
Previous Credit boom	0.023 (0.41)	0.421 (0.89)	0.466 (0.86)	0.204 (0.40)
Deposit freeze or guarantee	1.140** (2.03)	0.631 (1.33)	0.633 (1.15)	1.010 (2.01)
Number of banks closed	0.187 (1.43)	0.104 (0.96)	0.129 (1.05)	0.320** (2.69)
Government intervention	0.063 (0.11)	0.349 (0.74)	0.067 (0.13)	0.146 (0.29)
Private Investment ( <i>percent of total investment</i> )	6.647** (2.60)	3.755* (1.74)	5.919** (2.44)	5.220** (2.30)
Cost of financing (a)	-0.069** (-1.90)	-0.018 (-0.59)	-0.053 (-1.59)	-0.059* (1.89)
Fresh capital injections into financial sector	0.955* (1.68)	0.417 (0.88)	0.787 (1.45)	0.612 (1.22)
Highly Indebted ( $t-1$ )	-0.188 (-0.22)	-0.301 (-0.50)	-0.014 (.002)	-0.965 (-1.23)
Constant	2.621** (2.55)	3.332** (3.95)	2.701** (2.63)	2.774*** (3.10)
Observations	112	112	112	112
Adj. R-squared	0.298	0.353	0.262	0.342



Table 10

## Explaining Post-Crisis Growth Controlling for Initial Economic Conditions

Item	Average Growth ( $t-t+5$ ) (OLS)			
	Model 1	Model 2	Model 3	Model 4
Expansionary fiscal policy	0.163 (0.64)	0.463 (0.36)	0.132 (0.44)	0.241 (0.39)
Expansionary fiscal policy* High GDP per Capita ( $t-1$ )	0.545* (1.86)	0.442 (1.55)	0.456 (1.34)	0.572* (1.91)
Public consumption ( <i>percent of total expenditure</i> )	-0.234 (-0.52)			
Public consumption* High GDP per Capita ( $t-1$ )	0.117* (1.57)			
Public investment ( <i>percent of total expenditure</i> )		0.259*** (5.94)		
Public Investment* High GDP per Capita ( $t-1$ )		0.371*** (6.52)		
Income tax revenue ( <i>percent of total revenue</i> )			-0.037 (-0.88)	
Income tax revenue* High GDP per Capita ( $t-1$ )			0.028*** (2.22)	
Goods & services tax revenue ( <i>percent of total revenue</i> )				0.358*** (4.94)
Goods & services tax revenue * High GDP per Capita ( $t-1$ )				0.407*** (5.07)
Previous Credit boom	0.123 (0.51)	0.321 (0.92)	0.326 (0.89)	0.324 (0.60)
Deposit freeze or guarantee	0.610** (2.03)	0.631 (1.53)	0.637 (1.56)	0.910* (2.01)
Number of banks closed	0.227 (1.43)	0.214 (0.96)	0.219 (1.05)	0.213** (2.69)
Government intervention	0.333 (0.14)	0.359 (0.75)	0.337 (0.17)	0.316 (0.19)
Private Investment ( <i>percent of total investment</i> )	4.647** (2.64)	3.701* (1.94)	5.034** (2.24)	5.330** (2.20)
Cost of financing (a)	-0.089** (-2.90)	-0.088 (-1.59)	-0.083 (-1.62)	-0.089* (1.99)
Fresh capital injections into financial sector	0.905* (1.98)	0.407 (0.98)	0.707* (1.95)	0.602* (1.92)
High GDP per capita ( $t-1$ )	0.237* (1.86)	0.215* (1.96)	0.219* (2.05)	0.233** (2.71)
Constant	2.600** (2.56)	3.302** (3.99)	2.700** (2.69)	2.704*** (3.19)
Observations	112	112	112	112
Adj. <i>R</i> -squared	0.382	0.397	0.363	0.373

end of the banking crises is registered when output growth resumes. However, this definition may be inappropriate if the banking sector problems are resolved quickly, but GDP growth lags. As an alternative, the end of the crisis is defined as the first year in which the stock market index returns to its precrisis level. Under this definition, episodes' duration is shorter than in the baseline. Results are robust to alternative definitions of duration.<sup>6</sup>

The index of fiscal expansion used in the baseline model is incapable of differentiating between fiscal expansions which are discretionary and those which are the unintended result of a dramatic collapse of GDP growth. We

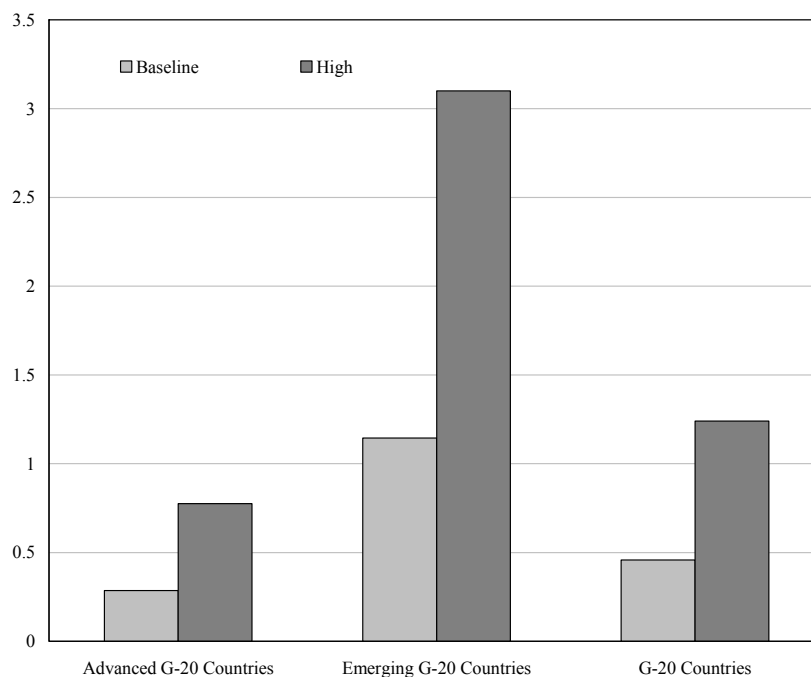
calculated an indicator of discretionary fiscal policy.<sup>7</sup> Results are consistent with the baseline. Finally, we controlled for potential endogeneity between crisis duration and fiscal policy: Since fiscal policy and output growth are correlated, baseline results could be biased as GDP growth enters the definition of crisis length. In order to control for this factor, we used a Two-Stage Least Square (TSLS) estimator, employing all other independent variables and a measure of liquidity support as instruments. Results confirm that the main findings hold.

## 8 Conclusion

This paper has assessed the effects of fiscal policy response during 118 episodes of systemic banking crisis in advanced and emerging market countries during 1980-2008. The results show that timely countercyclical fiscal measures can help shorten the length of crisis episodes by stimulating aggregate demand. Fiscal expansions based on measures to support government consumption are more effective than those based on public investment or income tax cuts. But these results do not

**Figure 4**

### Impact of the Fiscal Stimulus Composition on Post-crisis Growth (percent)



Source: Author's calculations.

<sup>6</sup> The details are available in Baldacci, Gupta, and Mulas-Granados (2009).

<sup>7</sup> We take the value of the primary surplus which would have prevailed, were unemployment at the same value as in the previous year, minus the value of the primary surplus in the previous year. Both variables are expressed as a percent of GDP. When this change was greater than  $-1.5$  per cent of GDP, we labeled the year as a fiscal expansion (value 1), and zero otherwise.

hold for countries with limited fiscal space where fiscal expansions are prevented by funding constraints or limited access to markets. The composition of countercyclical fiscal responses matters also for post-crisis growth recovery, with public investment yielding the strongest impact on growth. These results suggest a potential trade off between short-run aggregate demand support and medium-term productivity growth objectives in fiscal stimulus packages adopted in distress times.

They also suggest that fiscal stimulus packages by G-20 countries may have reduced crisis length by up to one year and could have stimulated post-crisis growth by up 1 percent of GDP, compared to a scenario where fiscal policy response was not implemented. Figure 4 shows that based on the composition of the fiscal stimulus implemented by G-20 countries in 2009 and the regression results presented in the paper, post-crisis real growth rate could be higher by almost  $\frac{1}{2}$  percentage point for these countries. Results can be larger for emerging market economies that devoted a higher share of the stimulus to infrastructure. In these countries, the baseline impact is estimated at more than 1 percent, compared to less than  $\frac{1}{4}$  of one percent in advanced economies that made larger use of tax cuts and increases in transfers. These results are higher if one uses the regression coefficients for countries with low initial fiscal vulnerabilities and high per capita income as discussed in the previous sections.

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# FISCAL POLICY AND GROWTH: DO FINANCIAL CRISES MAKE A DIFFERENCE?

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*In this paper we assess to what extent in the existence of a financial crisis, government spending can contribute to mitigate economic downturns in the short run and whether such impact differs in crisis and non crisis times. We use panel analysis for a set of OECD and non-OECD countries for the period 1981-2007. The fiscal multiplier for the full sample for instrumented regular and crisis spending is about 0.6-0.8 considering the sample average government spending share of GDP of about one third. Altogether, we cannot reject the hypothesis that crisis spending and regular spending have the same impact using a variation of controls, sub-samples and specifications.*

*“The claim that budget deficits make the economy poorer in the long run is based on the belief that government borrowing “crowds out” private investment. (...) Under normal circumstances, there is a lot to this argument. But circumstances right now are anything but normal.” Paul Krugman, New York Times, December 1, 2008.*

*“Fiscal policy is back. (...) Fiscal policy must be more effective at times when credit and liquidity constraints are tighter, because firms and households spending decisions are more dependent on current income.” Giancarlo Corsetti, VOXEU, February 11, 2008.*

## 1 Introduction

In 2008-09 the world was hit by what many people now believe is one of the deepest financial crises in modern history. This view relates both to the aggregate volume of non-performing loans (mainly in the housing sector) and to the fact that international financial linkages almost immediately lead to contagion effects around the globe. In the response to these developments, governments around the world initiated huge fiscal stimulus packages. According to the IMF (2009), the US announced the implementation of discretionary fiscal measures of 3.8 per cent of GDP in 2009-10, and the European Union unveiled a European Economic Recovery Plan encompassing a planned two hundred billion Euro fiscal stimulus package. For the OECD, the

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accumulated budget impact of the stimulus package over 2008-10 reaches 2.5 per cent of GDP (OECD, 2009).<sup>1</sup>

Many economists support these measures, including well known scholars such as Paul Krugman or Joseph Stiglitz. But also economists who were previously opposed to active stabilization policies seem to be in support of such policies under the current – exceptional – circumstances.<sup>2</sup>

These new policy measures contrast with the results of recent empirical research on the potential impact of debt-financed fiscal policy measures (such as spending programmes and tax reductions) on economic growth. There is a wide body of literature which carefully studies the size of fiscal multipliers. The common conclusion of this literature is that there are significant effects of fiscal policy on output.<sup>3</sup> Nevertheless, many papers also conclude that the size of these effects is rather small and the estimated multipliers of government spending or tax reduction are below one. Moreover, in many countries the multipliers declined over the 1980s and 1990s. Taking into account that any debt-financed fiscal stimulus package has to be repaid later on (with interest payments) one may have serious doubts in the usefulness of such policy measures.

However, one may argue that times of financial crises are different from normal times. Indeed, there are some good reasons to believe that the economy reacts differently to discretionary fiscal policy in a financial crisis than during normal times. First, there are some theoretical contributions which distinguish between more classical and more Keynesian regimes on output and labour markets (e.g., Malinvaud 1985; Bénassy, 1986). A classical situation would be one, where unemployment is generated by excessive real wages while output markets are in equilibrium. A more Keynesian regime is one where unemployment and excess capacities coexist. There are disequilibria both on labour and on output markets. One can argue that in such a situation a fiscal stimulus may become more effective, replacing declining private demand for goods and so stimulating private demand for labour. One could view the public provision of private goods as a replacement for the private provision of these goods. In this case the state would take consumers' decisions in their place and run a higher deficit that later on would have to be repaid in form of taxes by these consumers. Such a policy might have strong crowding-out effects in a situation where capacities are already exhausted, but this need not be the case when there are excess capacities in the economy.

A second argument in favour of discretionary fiscal policy is that a liquidity trap is associated with financial crises and that “the only policy that still works is fiscal policy” (both Krugman and Stiglitz advocate that).

Most importantly, one can argue that financial crisis cut off many consumers and producers from bank lending. During the current crises, the growth rate of lending to the private sector has fallen significantly. This may have two effects on the effectiveness of fiscal policy measures. First, government transfers or tax reductions may result directly in increased consumption of relatively poor, credit constrained consumers. Along these lines, Galí *et al.* (2007) recently calculated larger fiscal policy multipliers when more consumers spend their current income. Second, government purchases directly affect the survival of some firms.

<sup>1</sup> In addition, the headline support for the financial sector is estimated (IMF, 2009), for instance, at 3.7 per cent of GDP in Germany, 6.3 per cent in the US, and 19.8 per cent in the UK.

<sup>2</sup> In 2008, the German council of economic advisors recently proposed to raise government spending by 1 percent of GDP in order to stimulate the economy, a measure that hardly would have found its support in recent years.

<sup>3</sup> See, for instance, Fatás and Mihov (2001), Blanchard and Perotti (2002), Perotti (2004), de Arcangelis and Lamartina (2003), Galí *et al.* (2007), Afonso and Claeys (2007), Afonso and Furceri (2010), Afonso and González Alegre (2008), and Afonso and Sousa (2009).



Therefore, it is an interesting question whether the emergence of a systemic financial crisis changes the way in which fiscal policy measures affect the economy. This is the question that we want to address in this empirical research. We assess to what extent in the existence of financial crises, government spending can contribute to reduce observed output losses and to foster economic growth. We employ a panel analysis for a set of OECD and non-OECD countries for the period 1981-2007.

Since causality may run in both directions, from government spending to GDP and from GDP to government spending, we instrument government spending by using a variable that is based on the distance to the next or, respectively, to the last democratic election as an instrument in our analysis. Moreover, we also use the past government budget balance-to-GDP ratio as an additional instrument. We perform each specification and sub-sample with a 1-year and with a 2-year definition of financial crisis, with and without time fixed effects.

Overall, our main result is that we cannot reject the hypothesis that crisis spending and spending in the absence of a financial crisis have the same impact throughout our study using a variation of controls, sub-samples and specifications.

The remainder of the paper is organized as follows. Section two reviews the related literature. Section three briefly presents our empirical methodology. Section four reports and discusses the results of the empirical analysis. Section five concludes the paper.

## 2 Related literature

A theoretical model that establishes a relationship between credit constraints and the effects of fiscal policy is Galí *et al.* (2007). They develop a sticky price model, in which a certain fraction of households always consume their current income. These “rule-of-thumb consumers” coexist with Ricardian consumers. The larger the share of rule-of-thumb (non-Ricardian) consumers the larger is the effect of fiscal policy on output and consumption. One may think of these consumers as credit constrained individuals – or as individuals with no access to financial markets at all.<sup>4</sup> Therefore, one can view that study as supporting a link between credit market conditions and fiscal policy effectiveness. In addition, a calibration of such a model produces relatively large deficit spending multipliers.

The idea that credit frictions have an impact on the way in which policy shocks affect the economy is also well known in monetary economics. An important earlier contribution that links credit market imperfections with the impact of policy shocks is Bernanke, Gertler and Gilchrist (2000). They consider moral hazard in the lending relationships between financial intermediaries and firms and between households and intermediaries. These imperfections strengthen the impact of macroeconomic shocks on output but also the impact of policy responses. Therefore, the study supports the view that policy interventions work better when credit markets are not working well.

The present paper is related to the empirical literature that studies the effects of fiscal policy on output growth in “normal times”. For instance, Blanchard and Perotti (2002) initially applied structured VAR techniques to the measurement of fiscal policy effects on output and private consumption in the U.S., and Perotti (2004) extended their analysis to other OECD countries. Blanchard and Perotti find a fiscal stimulus in the US with multipliers ranging from 0.66 to 0.9. However, they also found that the effects of fiscal policies declined in the 1980s. Some multipliers

<sup>4</sup> The separation between Ricardian and non-Ricardian households, which have a higher propensity to consume, is quite paramount in the policy discussion, being notably one of the arguments used in support of recent fiscal stimuli packages implemented by the authorities in Europe. For the euro area the share of non-Ricardian households has been estimated around 25-35 per cent by Ratto, Röger and in 't Veld (2008) and Forni, Monteforte and Sessa (2009).

have become insignificant, others even negative. Bénassy-Quéré and Cimadomo (2006) argue that domestic fiscal policy multipliers have been declining in the U.S. (since the 1970s) and in Germany (since the 1980s), and that “cross-border” multipliers (from Germany to seven EU economies) have been diminishing.<sup>5</sup>

There is also an ongoing debate in the empirical literature about the role of exogenous expansion in government spending on consumption and real wages. Ramey and Shapiro (1998) find that, following an expansionary fiscal policy shock, output rises while private consumption falls (crowding out). Blanchard and Perotti (2002) instead find that output and consumption both increase. The main methodological difference is that Ramey and Shapiro use war build-ups as exogenous dates to identify fiscal expansions while Blanchard and Perotti use identifying restrictions which they derive from delays in the response of fiscal policy decisions to the economic development.

Case studies such as Johnson *et al.* (2006) also provide valuable insights into the effect of particular spending programmes on individual consumption.

For the EU, and using panel data for the 15 “old” EU countries for the period 1971-2006, Afonso and González Alegre (2008) identify a negative impact of public consumption and social security contributions on economic growth, and a positive impact of public investment. They also uncover the existence of a crowding-in effect of public investment into private investment that provokes an overall positive effect of public investment on economic growth.

More recently, using a Bayesian Structural Vector Autoregression approach for the U.S., the U.K., Germany, and Italy, Afonso and Sousa (2009) show that government spending shocks, in general, have a small but positive effect on GDP, have a varied effect on private consumption and private investment, reflecting the existence of important “crowding-out” effects, and in general, impact positively on the price level and on the average cost of refinancing the debt.

For the case of the U.S., Cogan *et al.* (2009), find that the government spending multipliers from permanent increases in federal government purchases are lower in new Keynesian models than in old Keynesian models. The differences are quite large regarding estimates of the impact on the future development of U.S. government spending in a fiscal package such as the one of February 2009. On the other hand Spilimbergo *et al.* (2008) argue that the content of the fiscal packages put in place in 2008-09 by the major developed economies, with targeted tax cuts and transfers are likely to have the highest multipliers.

Related to the 2008 financial crisis Blanchard (2008) argued that fiscal expansion must “now play a central role in sustaining domestic demand.” A similar argument was previously put forward by Krugman (2005) who argued that fiscal expansion is quite possible when economic downturns last for several years and low interest rates reduce monetary policy effectiveness. Nevertheless, Cerra and Saxena (2008) report that a financial crisis tends to depress long-run growth, which may cast some doubts on the short-term effectiveness of fiscal policies under such circumstances.

For a panel of 19 OECD countries, Tagkalakis (2008) finds that in the presence of liquidity constrained households, fiscal policy is more effective in increasing private consumption in recessions than in expansions. Such effect squares with the fact that usually constrained consumers contemplate short-term horizons in their consumption and saving decisions. This issue of credit

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<sup>5</sup> Van Brusselen (2010) provides a broad overview of the effectiveness of fiscal policy, and an evaluation of fiscal multipliers in VAR, macroeconomic models and dynamic stochastic general equilibrium models.

constrained households is also related to the possibility of expansionary fiscal consolidations, and the eventuality of ensuing non-Keynesian effects of fiscal policies.<sup>6</sup>

Finally, Baldacci *et al.* (2009) analyse the impact of fiscal policy taken during systemic banking crises, and they show that, if countries are not funding constrained, fiscal measures contribute to shortening the length of crisis episodes by stimulating aggregate demand. Their results can not directly be used to compare the impact of fiscal policies in crisis and non-crisis times. In a related study, Röger, Székely, and Turrini (2010) found that fiscal policy seems to play a role in the impact of banking crises on headline growth, an insight further rationalised with simulation results. Their econometric analysis consists of a set of OLS regressions distinguishing between crisis and non-crisis multipliers.

### 3 Empirical methodology

The focus of the present paper is on the role of fiscal policies in phases of financial turmoil. Such phases are associated with tighter credit constraints both for firms and for households, leading to pronounced economic downturns.

However, frequent financial crises in single countries are very rare. Hence, if one only looks at GDP in individual countries, there may not be enough data points to run a time series analysis for several countries, and provide meaningful information about the role of fiscal policies during a crisis. In order to overcome this problem we construct an unbalanced panel containing data from the available set of OECD and non-OECD countries.

We test the impact of government spending on economic growth during crises and normal times by interacting the fiscal stimulus variable with a (dummy) variable that indicates the state of the economy, “crisis” or “normal”. In addition, we also perform Wald tests with the null-hypothesis that the coefficients of crisis government spending and government spending in the absence of crisis are equal. The following linear panel model for output growth is then specified:

$$Y_{it} = \beta_i + \delta Y_{it-1} + \phi X_{it} + \gamma FC_{it} + \theta Sp_{it} * FC_{it} + \theta' Sp_{it} * (1 - FC_{it}) + u_{it} \quad (1)$$

In (1) the index  $i$  ( $i=1, \dots, N$ ) denotes the country, the index  $t$  ( $t=1, \dots, T$ ) indicates the period and  $\beta_i$  stands for the individual effects to be estimated for each country  $i$ .  $Y_{it}$  is real output growth for country  $i$  in period  $t$ ,  $Y_{it-1}$  is the observation on the same series for the same country  $i$  in the previous period,  $X_{it}$  is a vector of additional explanatory variables, in period  $t$  for country  $i$ .  $FC_{it}$  ( $FC_{it-1}$ ) is a dummy variable that captures the existence of a financial crisis (in the preceding year), either banking, currency or sovereign debt crisis, and  $Sp_{it}$  is real government spending growth for country  $i$  in period  $t$ . Additionally, it is assumed that the disturbances  $u_{it}$  are independent across countries. The interaction term  $Sp_{it} * FC_{it}$  denotes government spending in the presence of a financial crisis and  $Sp_{it} * (1 - FC_{it})$  picks up government spending during normal times. Both interactions terms are also tested using lags.

#### 3.1 Reverse causality

Obviously, the specification above is not immune to reverse causality. Current economic growth may affect the government's spending behaviour. The influence of GDP growth on contemporaneous spending holds true, in particular, for welfare benefits and subsidies, notably via

<sup>6</sup> The possibility of expansionary fiscal consolidations, notably when triggered by a crisis, was initially discussed by Giavazzi and Pagano (1990), although the empirical evidence is diverse (see, for instance, Afonso, 2010).

the functioning of automatic stabilisers. For instance, higher economic growth reduces expenses for unemployment benefits since more people are likely to find a job during an economic upswing. Lower growth can lead to higher government transfers as well as to discretionary, countercyclical spending such as infrastructure programmes. This negative causal effect from growth on fiscal spending would imply an underestimation of the fiscal stimulus' impact. Due to the large number of countries, data on government spending net of transfers were not available and we need to refer to different methods to address endogeneity.

Also, real economic growth can influence government spending in a positive way if governments follow pro-cyclically economic developments.<sup>7</sup> Under this assumption, politicians do not save (discretionarily) in good times and do not (discretionarily) provide fiscal stimuli in crisis times. Without accounting for endogeneity, this effect would lead to an overestimation of the fiscal multiplier. In our sample, which includes OECD and non-OECD countries, we find evidence of the first assumption, that growth affects spending in a negative way.

A possible way to address endogeneity would be to use time lags of the relevant explanatory variables. Due to data availability we can only use yearly change in spending. As shown by single country time series studies with quarterly data (for instance, Perotti *et al.*, 2004) the positive impact of a government spending shock vanishes approximately after four to five quarters. That is, with one year lagged spending growth as ordinary control variable, instead of current spending growth, we could address the endogeneity problem but we cannot measure the fiscal multiplier properly. Using lagged government spending as an instrument captures spending habits potentially linked to the institutional path of the economy, rather than discretionary changes in spending.<sup>8</sup>

### 3.2 Instrumenting spending growth

Altogether, to address the endogeneity problem we use two instruments, the *distance to elections* referring to the political budget cycle (Brender and Drazen 2005) and the *lagged budget balance-to-GDP ratio*. *Distance to elections* is a linear distance measure between the current year and the year of the next election. The election years are taken from Pippa Norris' Democracy Time series Dataset (2009). For non-OECD countries, we use the year of legislative elections. For OECD countries, we use legislative elections if the country has a parliamentary system and executive elections if the country is characterised by a presidential system.<sup>9</sup> The distance-to-elections indicator takes on values from 1 to 5.

By using a distance-to-elections indicator, which runs throughout the political budget cycle, we are benefiting from two effects: increase in spending before elections, decrease in spending after elections.<sup>10</sup> We obtain a more robust instrument than only using pre-election, election, and post-election dummies by imposing a parameterised linear relationship.

The parameterised linear relation between distance to elections and spending is not always identical: empirically, the year of elections ("zero distance") does not display the largest spending increase. Changes in government spending in the year of elections depend very much on when elections take place. Elections in spring can trigger spending cuts for the rest of the year while elections in autumn can lead to spending increases. Since our data do not provide information on

<sup>7</sup> Jaeger and Schuknecht (2004) mention that boom-bust phases tend to exacerbate already existing pro-cyclical policy biases, toward higher spending and public debt ratios.

<sup>8</sup> The results (not shown) for using the lagged crisis spending as an instrument in a basic panel set up are not statistically significant.

<sup>9</sup> Due to data accuracy, we use information on the political system only for OECD countries.

<sup>10</sup> The relations between electoral cycles and government behaviour be traced back to Nordhaus (1975) and Hibbs (1977), respectively regarding opportunistic and partisan cycles.

the month of elections, we test the impact of distance to elections by means of distance year dummies, hence without imposing a parametric structure. The coefficient of the election year dummy is smaller than the coefficients of the one and two year pre-election dummies and more similar to the coefficient of the three year pre-election dummy. Thus, we assume that, on average, the spending behaviour three years before elections<sup>11</sup> is similar to the spending behaviour in the election year. Therefore, we replace the actual value of the distance indicator in the election year (zero) by three.<sup>12</sup> Finally, by the nature of the instrument, we only capture states with regular elections as reported in the dataset. For each specification we report the results of the Kleibergen-Paap test reflecting the validity of our instruments.

As a second instrument we use the one year lagged budget balance-to-GDP ratio, the difference between total revenue and total expenditure of the central government relative to GDP. To avoid that the instrument lagged budget balance-to-GDP ratio is capturing good governance and disciplined political institutions, which is in turn correlated with GDP growth, the budget balance-to-GDP ratio is lagged twice and included in the main regression. Furthermore, to ensure that lagged budget balance to GDP is exogenous, we control for lagged spending growth and lagged revenue growth. The Sargan-Hansen test of over-identifying restrictions (not reported) strongly supports the validity of the above described instruments.

These two instruments capture different aspects of government spending. *Distance to elections* is a good measure for discretionary fiscal activities if politicians act according to the “political budget cycle”. The *budget balance ratio* considers the financial leeway provided by last year’s government budget to predict current spending. We perform the instrumental variable estimations with one and two (interacted) instruments.

## 4 Empirical analysis

### 4.1 Data

Our panel covers 127 countries out of which 98 countries experienced financial crises during the years 1981-2007. The crisis dummy was taken from the IMF dataset on financial crisis. The maximum number of observations used, due to data availability across the panel, is 2867 (3271 observations were initially gathered), and the number of crises years is 218 (encompassing banking, currency and sovereign debt crises). To avoid the influence of outliers, we restrict the dependent variable, GDP growth, as well as the spending variables by excluding the first and last percentile of the sample. Data descriptions and sources are reported in the Appendix.

In our panel, government spending increases on average at 0.76 per cent of GDP per year. Spending decreases on a yearly basis by 0.05 per cent of last period’s GDP on average in the starting year of the crisis and by 0.1 per cent of GDP in the next year. Hence, during financial crises governments tend to spend less money, eventually because revenues decline as well. Only during 90 crisis episodes we observe a positive change in government spending relative to GDP the year after the beginning of the crisis.

Real GDP growth is adversely affected by a financial crisis as will be confirmed in our regression results reported in the next sections. While the average real growth rate in our panel is 3.4 per cent, it goes down to 0.1 per cent during a crisis.

<sup>11</sup> In our sample, the average election cycle is four years. Therefore, three years before the next election corresponds on average to the post election year.

<sup>12</sup> Imposing a missing value in the election year or using the value of two instead of three we obtain similar but less robust results. The actual distance indicator for a country with a 4-year cycle over a period of, for instance, 8 years starting with an election year is accordingly: 3-3-2-1-3-3-2-1.

Table 1

**Results for Real GDP Growth (1981-2007), Spending Growth Rates,  
Instrument: Distance to Elections, 1-year Crisis**

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.322* (1.89)	0.228* (1.70)	0.180 (1.24)	0.0858 (0.68)
Spending*FC	0.642 (1.10)	0.489* (1.93)	0.428* (1.80)	0.601 (1.60)
GDP(-1)	0.197 (1.58)	0.243*** (2.66)	0.242** (2.49)	0.142* (1.73)
FC	-0.0797** (-2.17)	-0.0869*** (-3.89)	-0.0909*** (-4.36)	(dropped)
FC(-1)	0.000166 (0.03)	-0.000828 (-0.15)	-0.00112 (-0.22)	-0.00618 (-1.20)
Spending(-1)*(1-FC(-1))		0.00586 (0.33)	0.00472 (0.26)	0.00541 (0.33)
Spending(-1)*FC(-1)		0.0645 (1.49)	0.0583 (1.41)	0.0700 (1.05)
Revenue(-1)		0.00815 (0.33)	0.0139 (0.54)	0.0246 (1.33)
Claims on Private Sector				0.0168*** (2.65)
Inflation				-0.00261** (-2.20)
Time Fixed Effects	No	No	Yes	Yes
Observations	2,605	2,516	2,516	1,937
Cross-sections	122	122	122	101
Kleibergen-Paap LM Statistic	6.91	8.10	6.41	5.35
Kleibergen-Paap <i>p</i> -value	0.0086	0.0044	0.0113	0.0207
Wald Test Statistic	0.28	0.87	0.80	1.57
Wald Test <i>p</i> -value	0.5959	0.3502	0.3719	0.2096

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10, 5 and 1 per cent respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. GDP, Spending, Revenue and Claims on Private Sector are used as growth rates. FC – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

We also collected data on claims to the private sector. Indeed, some existing evidence links credit contractions to financial markets distress (see, Claessens *et al.*, 2008), and the hypothesis that increases in credit concession to the private sector can attenuate economic slowdowns is then tested.

#### 4.2 Results and discussion

Table 1 reports the panel estimation results using real GDP growth as the dependent variable as in specification (1), using only the distance to elections as an instrument for real government spending growth, and controlling for the existence of a financial crisis, in which case the dummy variable *FC* assumes the value of one (zero otherwise). We perform each specification with a 1-year definition of financial crisis – *FC* equals one in the starting year of the crisis – and a 2-year definition of financial crisis – where *FC2* equals one in the crisis' starting year as well as in the following year.<sup>13</sup>

From Table 1 we can see that increases in real government spending growth have a positive impact on real GDP growth. In addition, the estimated government spending coefficients are higher when a crisis occurs. However, as shown by the Wald test, we cannot reject the null hypothesis that the estimated coefficients for government spending are equal with and without a financial crisis. The existence of a financial crisis also decreases real growth unequivocally. In this specification government spending coefficients can not directly be interpreted as fiscal multipliers. We have to multiply them by the inverse average share of government spending in GDP.<sup>14</sup> In our data sample, government spending amounts to around 36 per cent of GDP for the full sample, 33 per cent of GDP for non-OECD countries and 46 per cent of GDP for OECD countries. Overall, the above fiscal multipliers (about 0.6-0.8 for regular and crisis spending) are somewhat smaller when compared to multipliers observed in the existing literature.

Similar results can be observed when government spending is instrumented with both the distance to elections and the lagged budget balance (see Table 2). In this case, the fiscal multiplier is around 0.8. In addition, both with one and with two instruments, we can see that claims to the private sector have a positive estimated coefficient, implying that increases in credit concession to the private sector can positively impinge on economic growth (see last columns of Tables 1 and 2).

Our sample comprises observations from a diverse set of countries and thus collects information from very heterogeneous financial crises. To allow for a different severity of crisis across countries and a reaction of economic variables to the occurrence of financial crisis (possibly due, for instance, to institutional differences) we interact country dummies with crisis dummies in each specification.

The above results from the IV regression with “differentiated fixed effects” are similar to the results obtained with a sample split into crises and non-crises observations.<sup>15</sup> By keeping the full sample and introducing a country specific interaction term with crises we benefit from gains in efficiency and instrument validity. Moreover, we can directly test the hypothesis of equality between spending in crises and non-crises times.<sup>16</sup>

<sup>13</sup> The results using the *FC2* variable can be found in Afonso, Grüner and Kolerus (2010).

<sup>14</sup> With  $Y = \text{GDP}$ ,  $G = \text{government spending}$  and  $m = \text{fiscal multiplier}$ ,  $(Y_t - Y_{t-1})/Y_{t-1} = m(G_t - G_{t-1})/G_{t-1} \Leftrightarrow \Delta Y_t = m \Delta G_t (Y_{t-1}/G_{t-1})$  and  $\Delta Y / \Delta G \cong m \times (Y / G)$ .

<sup>15</sup> Tables are not reported and can be obtained from the authors upon request.

<sup>16</sup> The coefficients of these interaction terms are not reported since they are partialled out in the regressions, together with the constant.

Table 2

**Results for Real GDP Growth (1981-2007), Spending Growth Rates,  
Instrument: Distance to Elections and Lagged Budget Balance, 1-year Crisis**

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.151*** (2.95)	0.291** (2.48)	0.251** (2.20)	0.192 (1.36)
Spending*FC	0.128 (1.60)	0.263** (2.13)	0.256** (2.12)	0.140 (1.09)
GDP(-1)	0.307*** (5.68)	0.226*** (2.92)	0.216*** (2.81)	0.117 (1.40)
GDP(-2)	0.0190 (0.53)	0.0227 (0.64)	0.0237 (0.69)	0.00771 (0.22)
FC	-0.111*** (-5.79)	-0.104*** (-5.40)	-0.105*** (-5.53)	
FC(-1)	-0.00835** (-2.06)	-0.00418 (-0.85)	-0.00427 (-0.92)	-0.00747 (-1.42)
Budget balance ratio(-2)	-0.0315 (-1.24)	-0.113 (-1.48)	-0.0991 (-1.40)	-0.134 (-1.40)
Spending(-1)*(1-FC(-1))		0.0367 (1.28)	0.0310 (1.15)	0.0375 (1.11)
Spending(-1)*FC(-1)		0.0533 (1.01)	0.0487 (0.96)	0.00794 (0.11)
Revenue(-1)		-0.0163 (-0.66)	-0.00886 (-0.38)	-0.00289 (-0.12)
Claims on Private Sector				0.0165*** (3.10)
Inflation				-0.00193*** (-4.13)
Time Fixed Effects	No	No	Yes	Yes
Observations	2,504	2,439	2,439	1,884
No. Clusters	122	122	122	101
Kleibergen-Paap LM Statistic	26.14	13.80	14.31	9.22
Kleibergen-Paap <i>p</i> -value	0.0000	0.0032	0.0025	0.0264
Wald Test Statistic	0.07	0.09	0.00	0.14
Wald Test <i>p</i> -value	0.7931	0.7691	0.9596	0.7090

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10, 5 and 1 per cent respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Equation (4) is over-identified. Constant as well as fixed effects interactions with crises dummy are partialled out.



A direct consequence of this approach is that – as in the case of fixed effects – observations for countries with only one crisis-year (singleton dummies) are not included in the analysis. Since many countries indeed experienced several financial crises, our *FC* dummy variable captures 111 crises years for 45 countries with 2 to 4 crises. The coefficient of the *FC* dummy in the tables has to be interpreted by taking into account that country specific crises reactions of GDP have already been partialled out. For robustness, we run every specification with a 2-year definition of crises, which also includes observations with only one crisis per country (see results in, Grüner, and Kolerus, 2010).

#### 4.2.1 Instrument performance

In Tables 1 and 2 we can reject the null hypothesis that the equation is underidentified. In Table 2, including the lagged budget ratio balance improves the instrument performance in the first stage for crisis spending. Indeed, the Kleibergen-Paap test statistic also passes the critical value of 10 allowing rejecting the null of underidentification.

Therefore, regular distance to elections and regular lagged budget balance ratios are good predictors for regular spending. The closer to elections, the higher is spending growth. The larger the buffer provided by last year's budget balance position relative to last year's GDP, the higher is government spending growth during normal times. The instrument lagged budget balance has a similar performance during financial crises as during regular times: there is a significant and positive correlation between regular spending and regular lagged budget balance. Distance to elections, however, changes the sign such that the political budget cycle during crises is positively correlated with crisis spending and is weakly (1-year crisis) to highly (2-year crisis, see Annex) significant. The further away elections are, the more the government is reacting via spending during crisis.<sup>17</sup>

#### 4.2.2 Fiscal multipliers

According to the results in Table 1 and 2 the fiscal multiplier for instrumented regular spending ranges between 0.6 and 1.1 assuming an average government spending share of GDP of about one third.<sup>18</sup> In addition, reverse causality seems to be stronger in crisis times. Indeed, our results show a somewhat larger marginal impact for crisis spending. Intuitively, this is appealing, implying that social transfers and discretionary spending react stronger during an expected and/or experienced economic downturn than in times of an economic upswing. Overall, albeit the qualitative differences, endogeneity does not influence our findings since the marginal impact of spending is not statistically different in crisis and non-crisis times.

Moreover, government spending in the presence of a financial crisis, when compared to normal times, is clearly larger in Table 1 compared to Table 2. This is likely to be due to a weak instrument bias for crisis spending when using only the distance to elections indicator (see above). Including the lagged budget balance ratio, the coefficients of crisis spending and regular spending are approximately equal.

<sup>17</sup> Exogeneity tests rejected the hypothesis that a fall in GDP leads to new elections, hence we reject the hypothesis that the instrument is correlated with the dependent variable.

<sup>18</sup> Our estimates based on different instruments yield output multipliers that are close to the ones derived, for instance, in the papers by Baxter and King (1993), Linnemann and Schabert (2003).

### 4.3 Robustness analysis

#### 4.3.1 OECD and non-OECD economies

Evidence from the related literature points out that (economic) cyclical fiscal behaviour in developed economies is somewhat different from the case of developing economies. The conventional wisdom that emerges from such studies is that fiscal policy is counter-cyclical or a-cyclical in most developed countries, while it is pro-cyclical in developing countries.<sup>19</sup> More specifically, reverse causality could be different in developed and developing economies. It is therefore important to analyse the instrument's performance and instrumented fiscal multipliers in OECD and non-OECD sub-samples.

As Table 3 shows, the results for non-OECD countries are close to the results obtained for the full sample and fiscal multipliers, for both crisis and regular spending, are on average 0.6. In addition, the instruments behave similarly in the first stage and statistical significance is even stronger compared to the full sample regressions.

For OECD countries, however, distance to elections, *i.e.* the political budget cycle, does not perform very well as an instrument during regular times (see Table 4).

Literature on the political budget cycle mostly confirms our results of different fiscal attitudes in OECD and non-OECD countries (see, for instance, Shi and Svensson, 2006). Interestingly, distance to elections matters for crisis spending as we find a significant negative correlation in the first stage. In other words, during financial crisis, fiscal action is required by the electorate in OECD countries. The lagged budget balance-to-GDP ratio is also significant during crisis with a clearly larger coefficient than in the non-OECD countries regressions, while it is not significant in regular times.

Overall, it proved to be difficult to build a significant instrument for regular spending in OECD countries. Therefore, in Table 4 (and Table 4b in the Annex) the under identification test is not passed. The reported value, however, only captures the average validity of instruments over both endogenous variables. The instruments for crisis spending, crisis distance to elections and crisis lagged budget balance, are still highly significant in the first stage. The fiscal multiplier of crisis spending ranges between 0.5 and 0.7 and is therefore slightly larger than in non-OECD countries (the underlying fiscal share is 46 per cent of GDP, as described above).

#### 4.3.2 Banking crisis

The previous analysis showed the impact of government spending on economic growth during up to 141 financial crises, which included banking crises, currency crises, and debt crises. Table 5 reports on to which extent government spending and growth are correlated during 60 banking crises.

Given the limited number of banking crises recorded in the IMF dataset on financial crisis, between 1981 and 2007 and, in particular, the high proportion of only one banking crises per country, we can only use the 2-year definition of crises, which provides us with two observations per crisis and thus allows us to use the singleton crises. Again, country dummies are interacted with banking crisis dummy in specifications (1)-(3) in Table 5, hence the coefficient of *BC2* has to be interpreted taking into account the country specific crises reactions. Without interactions, *BC2* is significantly negative, as in regression (1).

<sup>19</sup> See, for instance, Galí (1994), Lane (2003), Kaminsky *et al.* (2004), Talvi and Vegh (2005), and Alesina *et al.* (2008).

Table 3

**Results for Real GDP Growth (1981-2007), Spending Growth Rates, Instrument: Distance to Elections and Lagged Budget Balance, Non-OECD Countries, 1-year Crisis**

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.153*** (3.08)	0.258** (2.48)	0.218** (2.18)	0.177 (1.53)
Spending*FC	0.137* (1.65)	0.258** (1.97)	0.237* (1.90)	0.170 (1.33)
GDP(-1)	0.295*** (5.08)	0.229*** (2.99)	0.218*** (2.96)	0.0951 (1.26)
GDP(-2)	0.0329 (0.83)	0.0376 (0.98)	0.0295 (0.80)	0.0147 (0.40)
FC	-0.111*** (-5.72)	-0.104*** (-5.33)	-0.105*** (-5.47)	(dropped)
FC(-1)	-0.00756* (-1.66)	-0.00301 (-0.56)	-0.00337 (-0.68)	-0.00579 (-0.98)
Budget balance ratio(-2)	-0.0324 (-0.96)	-0.102 (-1.20)	-0.0825 (-1.08)	-0.160 (-1.39)
Spending*(1-FC(-1))		0.0332 (1.14)	0.0253 (0.93)	0.0422 (1.17)
Spending*FC(-1)		0.0545 (1.03)	0.0476 (0.93)	0.0268 (0.39)
Revenue(-1)		-0.0121 (-0.50)	-0.00362 (-0.16)	-0.00673 (-0.26)
Claims on Private Sector				0.0168** (2.32)
Inflation				-0.00204*** (-4.33)
Time Fixed Effects	No	No	Yes	Yes
Observations	1,814	1,750	1,750	1,261
Cross-sections	94	94	94	73
Kleibergen-Paap LM Statistic	26.99	15.79	16.36	12.42
Kleibergen-Paap <i>p</i> -value	0.0000	0.0013	0.0010	0.0061
Wald Test Statistic	0.04	0.00	0.04	0.00
Wald Test <i>p</i> -value	0.8479	0.9969	0.8329	0.9568

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10, 5 and 1 per cent respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 4

**Results for Real GDP Growth (1981-2007), Spending Growth Rates, Instrument: Distance to Elections and Lagged Budget Balance, OECD countries, 1-year Crisis**

	(1)	(2)	(3)	(4)
Spending*(1-FC)	0.784 (1.00)	1.029 (0.85)	0.719 (1.09)	-0.0415 (-0.15)
Spending*FC	0.303*** (2.65)	0.327** (1.99)	0.284* (1.79)	0.216* (1.73)
GDP(-1)	0.121 (0.32)	-0.00886 (-0.02)	0.0932 (0.26)	0.411*** (4.03)
GDP(-2)	-0.135 (-1.55)	-0.141* (-1.65)	-0.0971 (-1.44)	-0.0642 (-1.29)
FC	(dropped)	0.0488*** (3.87)	(dropped)	(dropped)
FC(-1)	-0.0314 (-1.08)	-0.0379 (-0.83)	-0.0336 (-1.05)	-0.00437 (-0.28)
Budget balance ratio(-2)	-0.135 (-0.99)	-0.237 (-0.90)	-0.167 (-1.20)	-0.00491 (-0.06)
Spending*(1-FC(-1))		-0.0234 (-0.46)	0.0138 (0.32)	0.0364* (1.78)
Spending*FC(-1)		-0.0410 (-0.10)	0.161 (0.43)	-0.0359 (-0.20)
Revenue(-1)		0.0213 (0.26)	-0.00359 (-0.06)	0.00969 (0.35)
Claims on Private Sector				0.00730 (1.39)
Inflation				-0.0198* (-1.81)
Time Fixed Effects	No	No	Yes	Yes
Observations	690	689	689	623
Cross-sections	28	28	28	28
Kleibergen-Paap LM Statistic	2.69	0.68	1.11	3.68
Kleibergen-Paap p-value	0.4423	0.8775	0.7740	0.2977
Wald Test Statistic	0.32	0.37	0.48	1.12
Wald Test p-value	0.5702	0.5448	0.4907	0.2907

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10, 5 and 1 per cent respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *FC* – dummy variable for the existence of financial crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified. Constant as well as fixed effects interactions with crises dummy are partialled out.

Table 5

**Results for Real GDP Growth (1981-2007), Spending Growth Rates, Instrument: Distance to Elections and Lagged Budget Balance, 2-year Banking Crisis**

	(1) IV	(2) IV	(3) IV
Spending*(1-BC2)	0.163*** (2.93)	0.195* (1.83)	0.172 (1.62)
Spending*BC2	-0.164 (-1.25)	-0.116 (-1.07)	-0.130 (-1.15)
GDP(-1)	0.278*** (4.42)	0.249*** (3.19)	0.232*** (2.97)
GDP(-2)	0.0323 (0.97)	0.0417 (1.32)	0.0395 (1.25)
BC2	0.0571*** (7.68)	0.0550*** (8.26)	0.0531*** (7.99)
Budget Balance to GDP(-2)	-0.0314 (-1.24)	-0.0621 (-0.89)	-0.0612 (-0.90)
Spending(-1)		0.00876 (0.33)	0.00805 (0.31)
Revenue(-1)		0.00749 (0.35)	0.0101 (0.47)
Time Fixed Effects	No	No	Yes
Observations	2,438	2,375	2,375
Cross-sections	119	119	119
Kleibergen-Paap LM Statistic	22.92	14.42	13.86
Kleibergen-Paap p-value	0.0000	0.0024	0.0031
Wald Test Statistic	5.48	6.69	6.27
Wald Test p-value	0.0193	0.0097	0.0123

Notes: unbalanced panels with country fixed effects. t-statistics are in brackets. \*, \*\* and \*\*\* denote level of significance indicating 10, 5 and 1 per cent respectively. A Wald test is conducted to test whether crisis spending and regular spending are statistically different. The underlying null hypothesis of the test is that the coefficients of the interaction terms between spending and financial crisis are equal. *GDP*, *Spending*, *Revenue* and *Claims on Private Sector* are used as growth rates. *BC2* – dummy variable for the existence of banking crisis. The Kleibergen-Paap statistic tests the null that the equation is underidentified.

Essentially, in the IV estimation spending significantly differs in crises and non-crises times. While there is no impact of a change in spending in the first and second year of a banking crises on GDP growth, the impact of spending in normal times is still positive (and mostly significant) with a multiplier of about 0.5.

Performing the analysis with all remaining financial crises, hence debt and currency crises, supports these results (see Table 5b in the Annex), and the coefficient of crisis spending is larger as for the full set of financial crises. The difference between spending in crisis times and normal times is not significant.

## **5 Conclusion**

In this paper we have studied the impact of government spending on output notably during the occurrence of financial crises, covering 127 countries for the period 1981-2007. We have performed each estimation using a 1-year and a 2-year definition of financial crisis, with and without time fixed effects.

To address the endogeneity issue we have used two instruments: the distance to elections – a linear distance measure between the current year and the year of the next election – and the lagged budget balance-to-GDP ratio. According to the results, the fiscal multiplier for instrumented regular spending ranges between 0.6 and 0.8, considering the average government spending share of GDP of about one third. The multipliers of instrumented government spending are higher than the simple OLS multipliers. However, the differences between the coefficients of government spending in crises and non-crises periods are also insignificant in most of our estimations.

More specifically, the fiscal multiplier for the full sample and for the non-OECD sub-sample, for instrumented regular and crisis government spending, is about 0.6, with an average government spending-to-GDP ratio of one third. For the OECD sub-sample, government spending in the presence of a financial crisis also produces a fiscal multiplier of 0.6 assuming an average fiscal share of GDP of around 40 per cent. Moreover, for the sub-sets of OECD and non-OECD countries our results show, that altogether, we also cannot reject the hypothesis that government spending either in the presence or in the absence of a financial crisis has the same impact. Interestingly, for the cases when a banking crisis occurred, our results do not support the idea that expansionary fiscal policies positively impact on economic growth.

Therefore, the main result of our panel analysis is that that government spending has essentially the same impact on economic growth with or without a financial crisis. This result holds throughout our sample, using a variation of controls, sub-samples and specifications. Consequently, taking into account that larger spending programmes tend to be less targeted, this indicates that they may actually not be particularly helpful.

The present analysis is a first step and these conclusions are tentative. Additional research is needed to further study the relevance of fiscal policies in the context of financial crisis. One way forward would be to use more detailed data on the composition of government spending and to distinguish between budgetary components that react to changes in output and others that don't.

## **APPENDIX DATA DESCRIPTION AND SOURCES**

Non-performing loans: data available on the website of Luc Laeven, reported as a percentage of GDP at the peak of a crisis. <http://www.luclaeven.com/Data.htm>

Year of crisis: banking, currency or sovereign debt crisis. Source: IMF database on financial crises, Laeven and Valencia (2008), and at <http://www.luclaeven.com/Data.htm>

Government spending: general government spending deflated with the GDP deflator. For some countries only central government data are available. Source: IMF World Economic Outlook database.

Budget balance: general government budget balance as percent of GDP. For some countries only central government data are available. Source: IMF World Economic Outlook database.

Government debt: government gross debt as percent of GDP. For some countries only central government data are available. Source: IMF World Economic Outlook database.

Real GDP: Source: IMF World Economic Outlook database.

GDP gap: difference between actual and trend real GDP, as a percentage of trend real GDP. Trend GDP is estimated using an HP-filter on real GDP. The lambda value is chosen as 100.

Inflation rate: Consumer price index. Source: IMF World Economic Outlook database

Long-term nominal interest rate: Data are only available for OECD countries. Source: OECD Economic Outlook database.

Election dates: Legal and Executive Elections taken from Norris, P. (2009), *Democracy Time Series Dataset*, <http://www.hks.harvard.edu/fs/pnorris/Data/Data.htm>

## List of Countries

All Countries			OECD Sub-sample
Albania	Ghana	Oman	Australia
Algeria	Greece	Pakistan	Austria
Antigua and Barbuda	Guinea	Panama	Belgium
Argentina	Guinea-Bissau	Paraguay	Canada
Australia	Guyana	Peru	Czech Republic
Austria	Hungary	Philippines	Denmark
Azerbaijan	Iceland	Poland	Finland
Bahamas, The	India	Portugal	France
Bangladesh	Indonesia	Romania	Germany
Barbados	Iran	Russia	Greece
Belgium	Ireland	São Tomé and Príncipe	Hungary
Belize	Israel	Saudi Arabia	Iceland
Bolivia	Italy	Senegal	Ireland
Bosnia and Herzegovina	Jamaica	Seychelles	Italy
Brazil	Japan	Singapore	Japan
Bulgaria	Jordan	Slovak Republic	Korea
Burkina Faso	Kazakhstan	Slovenia	Luxembourg
Burundi	Kenya	South Africa	Mexico
Cambodia	Korea	Spain	Netherlands
Canada	Kuwait	Sri Lanka	New Zealand
Cape Verde	Kyrgyz Republic	Swaziland	Norway
Chile	Lao	Sweden	Poland
China	Latvia	Switzerland	Portugal
Colombia	Lebanon	Syrian Arab Republic	Slovak Republic
Costa Rica	Lithuania	Taiwan	Spain
Côte d'Ivoire	Luxembourg	Tajikistan	Sweden
Croatia	Madagascar	Thailand	Switzerland
Cyprus	Malaysia	Trinidad and Tobago	United Kingdom
Czech Republic	Mauritania	Turkmenistan	United States
Denmark	Mauritius	Uganda	
Djibouti	Mexico	Ukraine	
Dominican Republic	Moldova	United Arab Emirates	
Ecuador	Mongolia	United Kingdom	
Egypt	Morocco	United States	
El Salvador	Mozambique	Uruguay	
Equatorial Guinea	Namibia	Uzbekistan	
Estonia	Nepal	Venezuela	
Ethiopia	Netherlands	Vietnam	
Fiji	New Zealand	Yemen	
Finland	Nicaragua	Zambia	
France	Niger	Zimbabwe	
Georgia	Nigeria		
Germany	Norway		



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# TAX POLICIES TO IMPROVE THE STABILITY OF FINANCIAL MARKETS

Jason McDonald\* and Shane Johnson\*

*While tax policies did not cause the recent global financial crisis, they almost certainly contributed to key vulnerabilities in the international financial system. In this paper we review existing tax policies identifying a number of channels by which tax distortions increase an economy's vulnerability to financial shocks. In particular, we highlight how current tax policies contribute to excessive leverage, reduced transparency and increased complexity due to unproductive financial innovation. Rather than improving financial stability, some recent tax proposals, such as a Tobin tax or other financial sector taxes and levies, may in fact add to the vulnerabilities of the financial sector.*

*We identify a number of policy reforms which would reduce the potential for financial shocks to become crises with severe consequences for individual wellbeing. These reforms include, reducing corporate debt biases (such as through an allowance for corporate equity), improving loss offset provisions, eliminating transaction based taxes and moving towards accrual based taxation. These reforms would significantly improve risk allocation in the economy, particularly by reducing the bias towards leverage, improving the price revelation of financial products and the stability of financial markets. Many of these issues were also outlined in the recent Australia's Future Tax System review.*

## 1 Introduction

There appears general agreement among policy advisers and academics that while tax policy did not cause the recent global financial crisis, it may have contributed to it (see, for example, Lloyd, 2009; Slemrod, 2009; Shaviro, 2009, Keen *et al.*, 2009). This paper first discusses the likely causes of the crisis before outlining in more detail the likely role of the tax system. The paper then discusses some potential reforms to the tax system to improve financial market stability, which notably does not include additional taxes on the financial sector. Many of these issues and potential reform options were outlined in the recent Australia's Future Tax System review (Henry, 2010).

## 2 The impact of the Global Financial Crisis (GFC)

The world has recently progressed through one of the most destructive and dramatic economic events in the era of modern global capital. The financial crisis had significant real world economic effects, with output across the OECD falling 4.5 per cent in the year to 30 June 2009 and potential output being revised down by 2¾ percentage points compared to pre-crisis projections (OECD, 2009); unemployment in advanced economies rising to over 8 per cent in 2009 (IMF, 2009a), and budget deficits in advancing economies rising to 8.9 per cent on average (IMF, 2009a). The effects were by no means universal, with jurisdictions with more sophisticated and extensive financial systems (such as the United States and Europe) suffering proportionately

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The views in this paper are those of the authors and not necessarily those of the Australian Treasury.

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more than others with relatively unsophisticated markets (such as China and India). Countries with more trade exposure and less exposure to the kinds of “toxic” assets originating in the US subprime mortgage market also escaped with relatively better performances.

The GFC also significantly changed the international financial landscape. Indeed, the important financial centres of the world were unrecognisable from what they were just one year before. In late 2010, of the world’s one hundred largest banking groups only nine were rated AA or higher (and Australia had four of those) (Swan, 2010). Today, as well as some institutions, some previously ubiquitous financial products – such as mortgage backed securities (assets backed by expected mortgage flows), collateralised debt obligations (assets backed by mortgage backed securities, MBS, and other obligations) and credit default swaps (swaps which improved MBS by having other entities insure the default risk) – have evaporated. For example, global private-label securitization gross issuance (made up of asset-backed securities, collateralized debt obligations and derivatives and mortgage-backed securities) soared from almost nothing in the early 1990s to peak at almost \$5 trillion in 2006. In 2009 volumes dropped off sharply to around \$1 billion, much of this only with government support, while the United States MBS market no longer existed (IMF, 2009a, p. 81).

The GFC also changed the way that many people think about economic management, with the near universal re-emergence of counter-cyclical fiscal policy and pressure for increased regulation to address perceived failures in financial markets. Governments have also shown that they are willing to use less traditional economic responses to perceived economic problems, including equity injections and loans (for example, the US Government support for AIG), guarantees, the purchase of financial assets (such as the US Government’s Troubled Asset Relief Program) and even nationalisation (such as the takeover of Northern Rock by the UK Government).

### 3 What is a “financial crisis”?

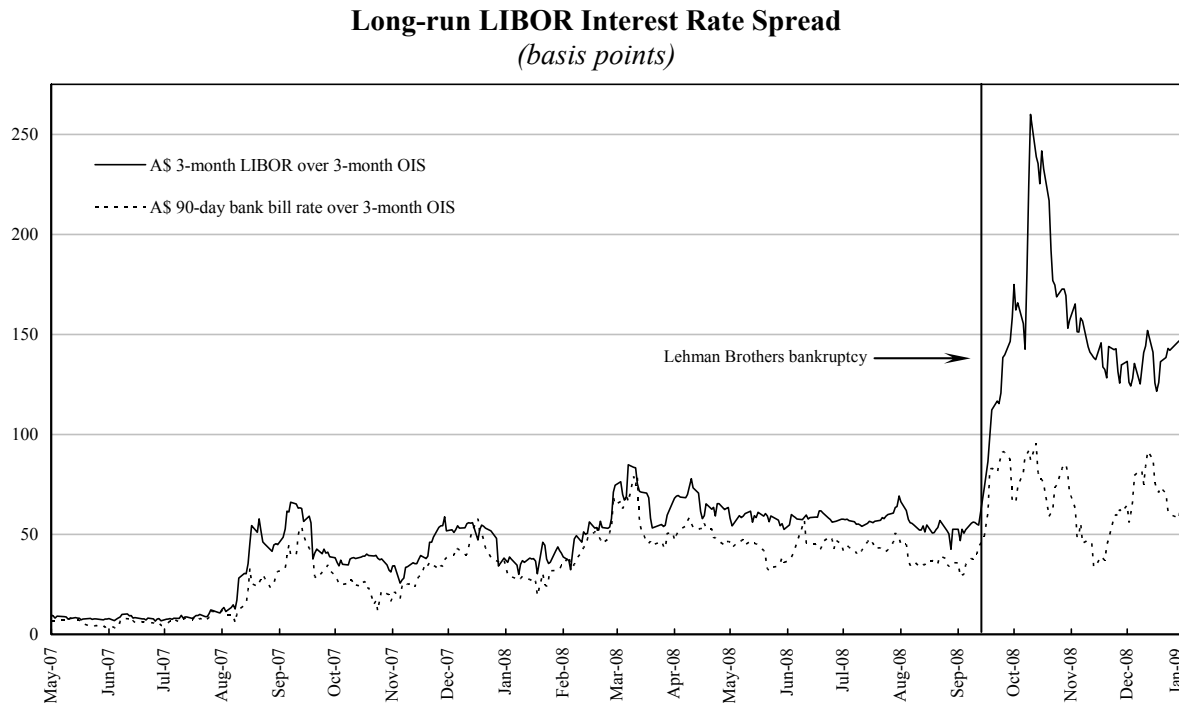
One indicator of the path of the progress of the financial crisis is the interest rate spread on inter-bank lending (measured by the London Inter-Bank Offer Rate, or LIBOR). The LIBOR is the interest rate that banks charge each other in the London wholesale market. Since the funds are unsecured, the interest rate spread accounts for both credit and liquidity risk (see Figure 1).

The crisis started in late July 2007 as default rates on United States “sub-prime” loans began to increase. This led to a slowly building concern in the United States mortgage backed securities markets through the latter part of 2007, events evolved more rapidly in the Autumn of 2008 with the collapse of Lehman Brothers. Soon after the Lehman Brothers collapse, the risk of short-term inter-bank lending rose by more than two percentage points. When a financial shock envelopes the whole financial system, it turns into a crisis, typified by the almost complete ceasing of many private credit markets and a flight towards debt of major economies (but away from the vulnerable, such as Iceland). Credit became unavailable from banks due to the fear that potential borrowers would be unlikely to repay because the businesses and individuals that owed them could not repay. This is a system wide collapse that no individual firm could withstand.

But it was not the losses themselves that led to this crisis of confidence. The total value of subprime mortgages reported in March 2007 of \$1.3 trillion is still less than three per cent of world stockmarket capitalisation at that time.<sup>1</sup> So even if all such mortgages foreclosed and the houses were worth nothing, there should have been a small fall in equity markets, not the 40 per cent that

<sup>1</sup> The value of world stock markets was \$52.6 trillion in March 2007, falling to \$31.1 trillion in November 2008 (<http://www.world-exchanges.org/statistics/ytd-monthly>). One contemporary media account quoting \$1.3 billion in subprime losses can be found here <http://www.msnbc.msn.com/id/17584725> (Associated Press reported, 13 March 2007).

Figure 1



Source: Australian Treasury.

soon followed. Even today, total defaults in the US mortgage market are only a fraction of the \$11 trillion of total outstanding mortgages. The financial markets have withstood other financial shocks without this flowing through to a credit crisis. In the past, share prices have fallen significantly (for example, the Dow Jones industrial average fell 29 per cent on one day in October 1987), the economy weak (in 1982, US unemployment neared 10 per cent and GDP fell by nearly 4 per cent) large firms have gone bankrupt (such as Enron in 2001) and significant parts of the financial system have malfunctioned (such as the US savings and loans crisis of the late 1980s).

Fundamentally, the market struggled to determine the size of potential losses and who actually bore them. The uncertainty flowed from the complex nature of the financial assets and obligations. Existing process for managing and measuring risk had proved themselves unreliable. The major ratings agencies continued to provide Lehman Brothers with at least an “A” rating right up until its collapse (US House of Representatives, 2009). Agency costs – paying for the management and monitoring of investments – are a means of dealing with asymmetries of information.<sup>2</sup> One way of viewing the crisis is that technology advanced so rapidly that agency costs could not keep up with inherent information asymmetries (see Arrow, 2008). Sometimes managers had incentives to hide the extent of such losses, sometimes they themselves may not have known what they were due to the complex nature of the arrangements and malfunctioning technologies for measuring risk. Because of this asymmetry in information and distrust of the agency arrangements for containing them, lenders refused to extend credit in ways they had in the past – first to firms suspected of poor business practices (some mortgage originators), then those

<sup>2</sup> This may not mean financial markets are inefficient. The weak form efficient markets hypothesis recognises that information is not free and trading in it can be costly, but no individual trader can make excess returns from trading on publicly available information (Fama, 1970).

Table 1

**Marginal Effective Tax Rates for Plant and Equipment, 2005**

	Australia	Canada	Italy	United Kingdom	United States
Statutory tax rate	30.0	35.6	37.3	30.0	39.3
Equity financed	24.3	24.8	19.1	20.3	23.6
Debt financed	−23.1	−37.0	−48.5	−27.6	−45.9

Source: Devereux, Griffith and Klemm (2002) and updated data available at [www.ifs.org.uk](http://www.ifs.org.uk)

with a heavy reliance on short term credit (investment banks) and finally even standard retail banks and businesses in the real economy. The economic purpose of financial markets is to relay information to guide efficient investment. When that information becomes tainted and unreliable, the consequence for markets has proven to be severe.

#### 4 The influence of tax policy

Tax systems around the world did not cause the recent global financial crisis, however it is likely that some elements at least contributed to the turmoil being of greater magnitude and duration than necessary. In that sense, it has a similar type of culpability to financial regulation that is sometimes cited as contributing to the crisis (for example, Cukierman, 2009). In particular, the tax system favours debt financing, investment in housing and assets earning capital gains. It also encourages people towards behaviours to avoid transaction taxes and make use of tax losses. The tax system therefore encourages people to expose themselves to risks that they normally wouldn't, increasing the overall susceptibility of the economy to financial shocks.

##### 4.1 Tax bias towards debt financing and corporate finance

Firms can raise finance in one of three ways, debt, new equity and retaining profits. Corporate tax systems in most countries are based on the full return to equity. Systems based on taxing the full return to equity have a bias towards debt financing over equity at the corporate level and therefore may encourage companies to rely excessively on debt finance. The bias towards debt arises because interest expenses are deductible while the cost of equity capital is not. The debt bias can be seen by comparing Marginal Effective Tax Rates (METRs) in Table 1 for equity and debt financed investments. For example, for Australia the METR for new investment in plant and equipment is estimated to be around 24 per cent, just below the statutory rate of 30 per cent. However, for the same investment financed by debt the METR is around −23 per cent. This suggests that the tax system not only favours debt financing, but subsidises investments that are debt financed.

While the implications of significant leverage are unclear, high levels of leverage can make companies more vulnerable to economic shocks and increase the probability of bankruptcy and therefore create a cost of financial distress. Highly leveraged companies are susceptible to volatility in profits, as they are required to make interest payments irrespective of profitability. As such, they are also more susceptible to volatility in interest rates.



### BOX 1 EFFECTIVE TAX RATES – DEBT AND EQUITY

The effective tax burden on capital income can be measured using Marginal Effective Tax Rates (*METR*s) and Average Effective Tax Rates (*AETR*s).<sup>3</sup>

The *AETR* measures the proportion of the value of an investment project which is paid in tax. It is given by the net present value of the tax paid by the investment divided by the present value of the pre-tax profit flows from the investment. As shown in Sørensen (2009) the *AETR* is given by:

$$AETR = \frac{\tau [p - \rho + (1 - A)(\rho + \delta) - \beta(r + \pi)]}{p} \quad (1)$$

where  $\tau$  is the company tax rate,  $p$  is the real net rate of return before tax,  $\rho$  is the company's real cost of finance, that is, the rate of return required by the investor supplying the funds for the project,  $A$  is the net present value of allowances,  $\delta$  the real rate of economic depreciation,  $\beta$  is the debt-to-asset ratio, and  $r + \pi$  is the nominal interest rate.

From equation (1) it can be seen that the *AETR* can be used to measure the tax burden on inframarginal projects where  $p - \rho$  is the pure rent from the project – that is, the difference between the actual pre-tax return and the investor's required return.

In contrast to the *AETR*, the *METR* measures the tax burden on the marginal unit of investment which generates no net profit for the investor. The *METR* is given by:

$$METR = \frac{c - \rho}{c} \quad (2)$$

where  $c$  is the real pre-tax rate of return on the marginal investment (user cost of capital). The user cost of capital, as shown in Sørensen (2009), is given by:

$$c = \frac{(1 - \tau A)(\rho + \delta) - \tau \beta(r + \pi)}{1 - \tau} - \delta \quad (3)$$

First, consider the case where investment is financed by equity ( $\beta=0$  and  $\rho=r$ ), where tax depreciation is set to reflect the true decline in the nominal value of the asset. The present value of depreciation allowances ( $A$ ) and the user cost of capital ( $c$ ) are given by:

$$c = r/(1 - \tau)$$

$$A = \frac{\delta - \pi}{r + \delta}$$

Hence:

$$MERT = AETR = \tau \quad (4)$$

That is, the *METR* and *AETR* where the investment is financed by equity are equal to the statutory tax rate.

<sup>3</sup> The methodology used to calculate *METR*s and *AETR*s in this paper is based on Sørensen (2009).

Now, instead, consider the case where the investment is fully debt-financed ( $\beta=1$  and  $\rho=r$ ). The user cost of capital is now given by  $c=r$ . From (1) and (3):

$$METR = 0$$

and

$$AETR = \tau \left( \frac{p-r}{p} \right) \quad (5)$$

For a project earning rents, that is  $p>r$ , the  $AETR < \tau$ . As such, under a conventional company income tax where debt is deductible, the  $METR$  and  $AETR$  will be lower where the investment is funded by debt.

If leverage levels become unsustainable and lead to a credit crunch, firms and households are unable to access credit required for investment and consumption which can result in a collapse in demand. Such concerns are particularly relevant for countries with relatively large current account deficits (such as Australia) that are financed by the international community's willingness to lend in order to rollover existing debt.

Where markets cease to function, financing strategies predicated on the existence of well-functioning markets has serious consequences for individuals as well as nations. The uncertainties and costs associated with bankruptcy are one of the transaction costs that can accentuate financial crises. The International Monetary Fund recently suggested that the bias towards higher leverage increases the vulnerability of the private sector to shocks (IMF, 2009a).

As highlighted previously, the tax bias towards debt may be made worse where the tax system also allows assets to be depreciated at accelerated rates. Where the tax system allows for a deduction for both financing costs and economic depreciation, the tax system would have no impact on investment decisions at the margin. In this case the  $METR$  would be equal to zero (see Box 1) as all costs – financing and depreciation – are fully recovered. However, where accelerated depreciation is allowed in addition to debt deductibility, the  $METR$  becomes negative, that is the investment is subsidised (see Box 2). As a result, this can distort resource allocation, and may encourage low-productive investment that would not have been viable in the absence of the tax system.

While tax systems based on the return to equity are biased towards debt, there are some factors that may have acted to reduce this bias. Company income tax rates have fallen across OECD countries over the past 30 years (see Figure 2). The unweighted average company income tax rate fell from around 47 per cent in 1982 to around 28 per cent in 2007. The weighted average (which is heavily influenced by the United States, Japan and the United Kingdom) has fallen to a lesser extent, from around 50 per cent in 1982 to 36 per cent in 2006. A lower tax rate increases the cost of debt financing as it reduces the benefit from interest deductibility.

In some circumstances, financial innovation may be reducing the tax bias towards corporate debt. For example, if a financial instrument acts like equity for accounting or regulatory purposes (and has similar economic characteristics), while having the additional benefit of being deductible for tax purposes, then the tax bias is eliminated. For example, in the United States hybrid instruments such as convertible debt obligations are treated as debt for tax purposes, but have equity like characteristics (Shaviro, 2009). Of course, while they may qualify as debt for tax purposes, the securities are likely to be less permanent, and give the investor greater rights to

### BOX 2 EFFECTIVE MARGINAL TAX RATES – DEBT AND ACCELERATED DEPRECIATION

Where an asset is written off at an accelerated rate the required return will fall below  $r$ . The required return falls below  $r$  because accelerated depreciation is effectively allows for tax to be deferred. Where the required return falls below  $r$  the METR will be negative, this compares to an *METR* of 0 where tax depreciation is appropriately measured (see Box 1).

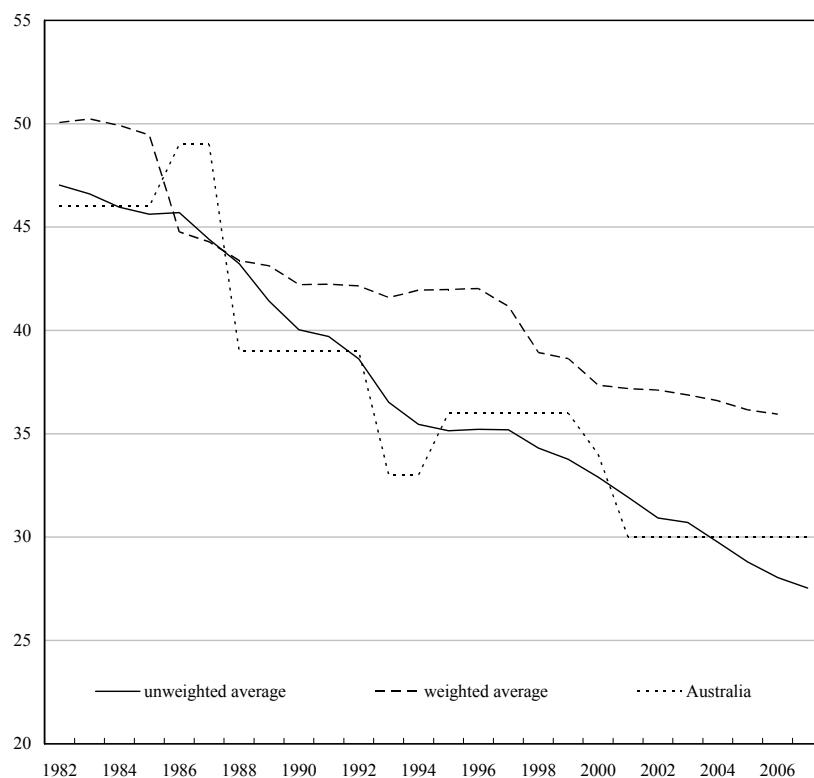
To see this, consider the case where investment is debt financed and the cost of the new investment is immediately expensed. In this case the present value of depreciation allowances ( $A$ ) would equal 1. Using (3) again, the cost of capital equation for a break even project would be:

$$c = r - \frac{\tau(r + \pi)}{1 - \tau} \quad (6)$$

The cost of capital in (6) is less than the discount rate for positive values of  $r$  and  $r + \pi$ , thus yielding a negative *METR*, or a subsidy.

**Figure 2**

**Statutory Corporate Tax Rates in the OECD, 1982-2007**  
(percent)



Source: Loretz (2008), with additional data from author.

dividends/interest, than ordinary share capital and as such may be a less secure (that is, more risky) form of capital. Global issuance of such hybrids reached \$170 billion in 2007 (Lloyd, 2009, p. 8).

One alternative means of accessing debt interest deduction, if you are a multinational, is to take advantage of the tax benefits for debt financing by lending to subsidiaries (and in extreme cases transfer pricing). The use of such tax avoidance mechanisms reduces the corporate debt tax bias, while effectively allowing taxpayers to choose their tax rate. Investors are effectively able to choose whether they wish to be taxed at the

corporate tax rate (through equity finance) or their individual marginal tax rate (though debt finance) (Shaviro, 2009 and Slemrod, 2009). Rather than increasing financial risk, the social cost is the loss in revenue from an optional tax system, valued at the cost of making up the revenue from other distorting taxes (see Slemrod, 2009).

In relation to the regulated financial sector, capital adequacy rules limit the debt component of a company's capital. However, the tax deduction for interest may still provide an incentive for

firms to maximise debt financing within the prescribed limits. Furthermore, the tax system may also encourage capital to be issued in the form of hybrid instruments that may be classified as debt at least for tax purposes (Lloyd, 2009).

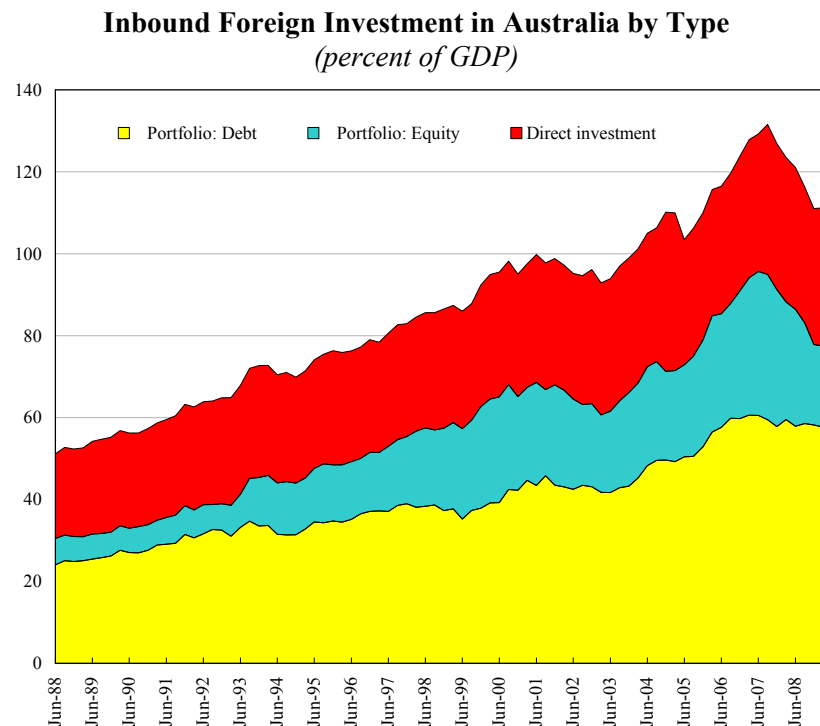
To the extent that firms cannot access international finance, as may be the case for smaller unlisted companies, financing decisions may also be influenced by taxes at the individual level (such as the taxation of dividends, capital gains and interest). Where tax systems double tax the return to equity, this may also result in a bias towards debt financing. In recent years many European countries have moved away from full imputation systems, which remove the double taxation of equity, towards uniform credits (United Kingdom) or reduced dividend tax rates (Ireland).

In Australia (and New Zealand) the bias towards debt may be offset to some degree by the full dividend imputation system (introduced in Australia in 1987) and concessional taxation of capital gains. These measures remove the double taxation of equity and result in a bias towards domestic equity for domestic resident savers. However, foreign investors cannot utilise imputation credits and therefore, for foreign investors debt is still preferred and has grown in recent years (Figure 3).

#### 4.2 The tax preference for housing

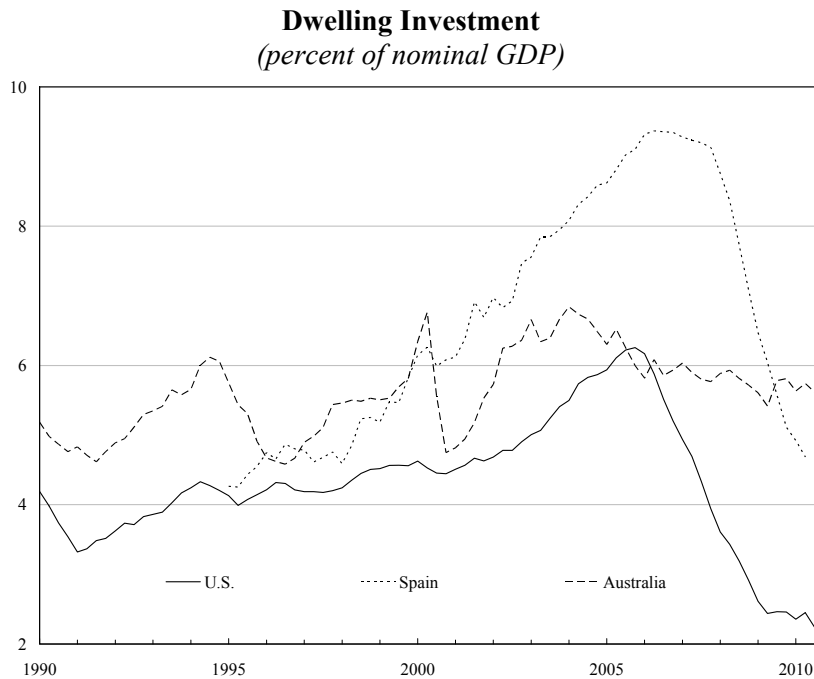
The accumulation of wealth in the form of home equity is one of the most important forms of household saving in OECD countries. It is also intimately associated with recent financial crisis in a number of ways. In particular, the crisis is generally thought to have begun in the United States subprime mortgage market. Further, the crisis also resulted in substantial falls in housing investment, particularly the United States and Spain (Lowe, 2010).

**Figure 3**



Australian Bureau of Statistics catalogue 5302.0.

Figure 4



Source: Australian Bureau of Statistics catalogue 5206, Lowe (2010).

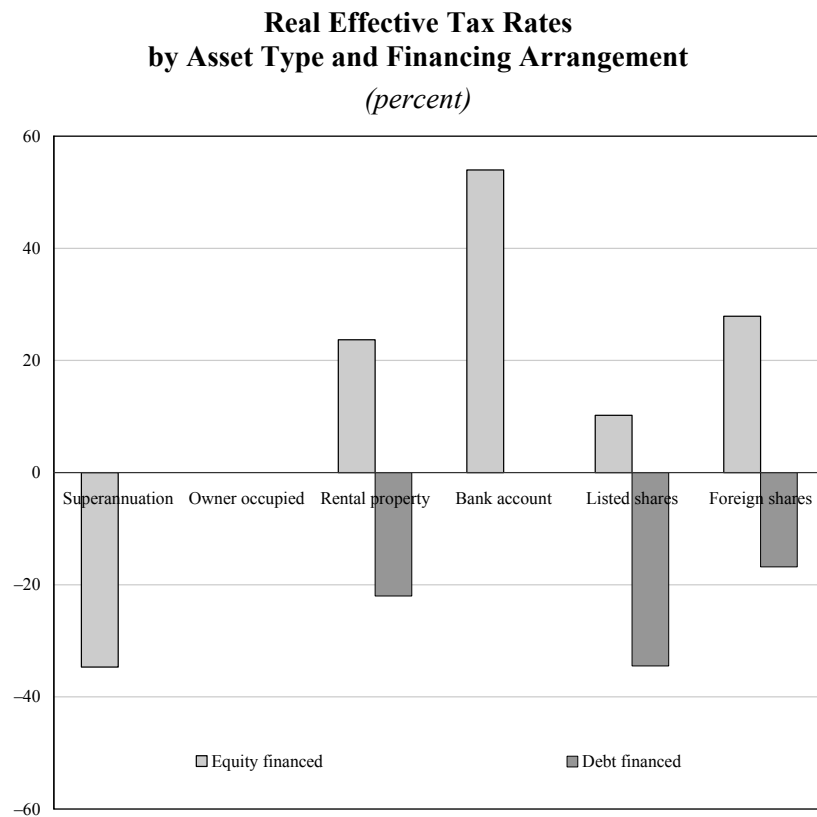
Australia stands out in not having a significant fall in housing investment. Indeed, the IMF recently announced that Australia's house prices may be up to 20 per cent overvalued – and that was before the most recent growth (IMF; 2009b). Many of the curiosities of the Australian housing market reflect the biases that you would expect from the way taxes are levied, although it is difficult to determine how important these effects are. The role of the taxation of housing should not be overstated, since its role in contributing to the instability in the financial system is inconclusive.

In particular, collapses in housing prices occurred in countries with limited preferences to home ownership (Shaviro, 2008, p. 3). However, elements of some countries tax systems may have contributed to housing price booms. For example, until 1985, Australians could earn capital gains tax exempt income from any source, not just housing. As income tax rates have risen for more workers and available tax shelters have been reduced, the remaining tax preferences for housing have become more valuable. Similarly, Fane and Richardson (2005) argue that the 50 per cent CGT discount for rental property introduced in 2000 directly stimulated the increase in debt and housing prices. Other factors could include differential degrees of financial innovations, such as reverse mortgages, which effectively allow investors to make greater use of housing tax preferences as a means of saving. The Productivity Commission (2004) and Reserve Bank of Australia (2003) have suggested that favourable taxation settings in Australia can contribute to volatility of the housing market.

It is worth illustrating some of the features of tax systems around the world which may contribute to less stable housing and financial markets with reference to Australia. First, like most countries, owner occupied housing is exempt from income tax. Few countries tax imputed rents while capital gains are typically tax exempt. Investment properties are also favourably taxed with capital gains typically concessionally taxed, and taxed only on realization. Overall, because housing is a significantly tax preferred, more of the nation's savings is likely to be devoted to housing than under a more neutral diversified national savings portfolio. Indeed, relative to other savings tax preferences, biases to saving in housing may expose domestic economies to greater risk. The owner-occupied tax preference can only be accessed for most through domestic house purchases and few opportunities are available for investing in overseas investment properties. Housing assets are undiversified in many people's portfolios. According to the ABS, the principal assets of Australian households are: their own home (44 per cent of household assets) followed by other property – including rental properties (16 per cent) (ABS 6553.0).

Second, there is a debt bias towards investment housing in Australia, since the interest is fully deductible whereas the capital gains are only taxed at 50 per cent. The impact of these arrangements is highlighted in Figure 5. For rental properties, the effective tax rate will vary depending on the financing choice of the investor. Where the investment is funded by equity, the effective tax rate is small, but positive, reflecting the concessional treatment of capital gains. But, where the investment is financed (at least partially) by debt the effective tax rate is negative, this results in a significant asymmetry. This result also applies to shares.

Figure 5



Source: Henry (2009).

Household mortgage debt has more than tripled in the past ten years to over one trillion dollars. Increasing house prices in Australia have been associated with a substantial increase in household debt, with household debt rising from around 90 to almost 160 per cent of annual household disposable income over the past 10 years (RBA; Statistical Tables). Debt financed housing contributes to a significant amount of Australia's gross borrowing requirements and contributes to a current account deficit, averaging 4.6 per cent of GDP over the same period. Such preferential tax treatment for housing may have higher social costs than corporate preferences for debt because of the relative unsophisticated or liquidity constrained nature of such investors and because the inherent "lumpiness" (non-divisibility) of the purchases reduces the scope for diversification. Corporates have more options for offsetting any debt biases by changing their portfolio (Slemrod, 2009, p. 5).

Third, there are a number of significant transaction costs to turning over houses in Australia, including: the realisation basis of taxing capital gains on investment housing; losing the exemptions from pension means tests when shifting from owner-occupied housing into other investments; and transaction taxes (in the form of stamp duty) twice the OECD average. This increases incentive to overinvest in existing homes. For example, young couples are more likely to buy larger homes than they need in order to not have to move and retired people may not downsize their accommodation as needed. This may be one reason why even though housing investment has been at historic highs for five years (at 6 per cent of GDP), housing supply has not kept pace. Even though investment in housing is higher than in the past, rental yields have continued to rise and vacancy rates are at record lows. Australians are investing in bigger and more expensive houses –

real expenditure on each new dwelling built is now 60 per cent higher than it was around 15 years ago. The size of the average Australian new home grew 40 per cent between 1984-85 and 2002-03 (ABS, 2005), even as the average household size fell (ABS, 2008). And Australians are upgrading their existing homes, rather than building new ones – a high proportion of dwelling investment is in the form of alterations and additions – that is upgrading existing houses rather than building new ones. Almost half of all dwelling investment has been accounted for by alterations and additions in recent years (Lowe, 2009). Transaction based taxes also reduce the turnover of housing, harming price discovery.

Fourth, a fragmented land tax regime with large thresholds for small investors. This may be one reason why rental properties are almost all held by small (as opposed to institutional) investors. Land tax applies only to investors and due to exemption thresholds, it increases with the number of properties owned, reducing the incentive for institutional investors and appropriate risk diversification.

Overall, the tax system provides incentives for small and relatively unsophisticated buyers that own highly leveraged, large houses that make up a disproportionate part of their financial portfolio.

#### *4.3 The tax preference for capital gains*

The Australian income tax system, like that on most other countries, tax returns in the form of capital gains concessionally. The concessional treatment of capital gains results in one of the greatest tax distortions to the savings choices of households.

Capital gains are typically only taxed when they are realised, providing a tax deferral benefit. The conventional justifications for deferring the taxation of gains until the time of realisation is that taxing accrued unrealized gains could lead to valuation and liquidity problems. Deferral however; generates its own problems by reducing the effective tax rate on accrued gains as investors as the payment of tax is deferred until the asset is realised, this effectively gives the taxpayer an interest free loan on their accrued tax liability.

Allowing deferral of taxation of accrued capital gains on shares could open the door to tax avoidance. For example, there is an incentive to construct positions where an investor holds gains and realises losses, thereby using the realisation event for tax arbitrage. Such possibilities have led to the introduction of limits in the tax system, such as limitations on loss utilisation even where a taxpayer incurs a true economic loss.

Taxing capital gains on realisation also creates a “lock-in” effect. This is because the tax deferral advantage encourages investors to hold on to assets with accrued capital gains. The lock-in effect impedes the efficient functioning of capital markets and distorts ownership patterns as investors are discouraged from switching assets and paying tax on a realised gain. The lock-in effect can also destabilise the stock market and real property market as shares and property are sold when prices decline (to realise losses) and are held onto when prices rise (to defer realisation of the gain).

In order to address the lock-in effect, most countries, including Australia, concessionally tax capital gains. For example, in Australia only half the capital gain is subject to tax where the asset is held for more than a year. This approach, while going some way to reducing the lock in problem, contributes to a further lowering of the effective tax rate on capital gains. This distorts asset allocation further, and may also distort company financing choice through the decision between distribution and retaining earnings.

The impact of a realisation based tax, combined with the 50 per cent exemption, is more pronounced where an asset is debt financed. Under this system, investors have an incentive to borrow (and deduct the full interest expense at marginal tax rates) and invest in assets that generate capital gains, which are concessionally taxed.

As the tax treatment of capital gains encourages investment in assets where the return can be categorised as capital gains for taxation purposes, to the extent that it is easier to convert the returns from a risk asset into capital gains the tax system could encourage more risky investment.

#### *4.4 Taxation and risk taking*

The tax system can affect risk taking. It has been well known since the contribution of Domar and Musgrave (1945), that an income tax system may encourage risk taking where full loss offset is provided.

Most countries corporate income tax systems do not however provide full loss offset. Income tax systems typically treat gains and losses asymmetrically. Gains are taxed when they are realised, while losses can only be used to offset future (or in some cases prior) taxable income, typically only under certain tests. While companies can use prior year losses against future income, typically subject to certain tests. While losses can be carried forward, their value erodes over time, and in some cases they can never be used and are wasted. In Australia, the stock of existing losses is over \$100 billion and growing with around \$30 billion of new losses generated each year, while only \$20 billion of losses are utilised (Abhayaratna and Johnson; 2009).

The asymmetric treatment of gains and losses is typically justified as an integrity provision. It reduces the scope for companies to create fraudulent losses in order to get a tax refund. Despite perceived integrity benefits, the asymmetric taxation of profits and losses is likely to lead to a misallocation of resources and risk in the economy.

Imperfect loss offset provisions can bias investment decisions towards safer investments over risky investments. In effect denying full loss offset reduces the expected return from risky investments. In addition, investments with a long lead time may not be undertaken because the present value of deductions diminishes when losses are carried forward and because of concerns that expenditure will fail loss-utilisation tests in future periods (under a partial loss-offset).

Similarly imperfect loss offset provisions may also distort corporate financing decisions towards equity rather than debt, as firms are unable to receive the full tax benefit of interest deductibility.

Limitations on the use of losses may in particular disadvantage entrepreneurial small businesses engaged in risky investments, with start up or closing down expenditure and without other income to offset losses against. The bias against small business may lead to greater market concentration, because larger more diversified businesses may have a higher expected post tax return when they have other income to use against a loss against.

Loss restrictions may also lead to inefficient takeover activity. This is because entities carrying losses forward are valued more highly by entities that can utilise those losses. The impact on takeover activity is likely to be exacerbated by loss utilisation tests which require a degree of continuity of ownership for the loss to be used.

In addition, such restrictions can lead to pressure on the government for concessions to compensate and attract investors to investments which suffer as a result of the restrictions. These concessions are typically targeted towards specific types of investments and therefore further



distort investment decisions. For example, in Australia concessions for research and development, film, and venture capital create a bias toward such investments.

Where losses are not fully refunded or where gains and losses are taxed at different rates, as under a progressive tax rate scale, these asymmetries will tend to discourage risk taking including entrepreneurial activity. The flattening of personal tax rate schedules in recent years may therefore have reduced the bias against risk taking.

In effect while restrictions on loss utilisation and progressive marginal tax rates may reduce risk taking, they may also discourage certain types of risk taking such as entrepreneurial activity, and therefore distort the allocation of, and pattern of risk in the economy.

During the crisis, imperfect loss offset also limited the tax systems effectiveness to serve as an automatic stabiliser. This is because the tax value of deductions is not injected into companies until they have income to offset the loss against. In turn this may have prolonged government deficits beyond the economy's recovery. In order to reduce these effects a number of countries extended (or introduced) loss carry-back provisions. Loss carry-back allows companies to utilise losses in the year they incur them, providing they have paid tax in prior years.

## **5 Are some of the proposed cures even worse?**

The financial sector is one of the most important for a well-functioning modern economy. Today, nearly every real transaction in the economy gives rise (or is guided) in some way by related financial transactions. Governments therefore need to be careful when intervening in financial markets, even (perhaps, most importantly) during crises, given the pervasive effects of financial signals.

Even though tax has not been one of the proximate causes of the crisis, it has recently gained popularity as one of the proposed responses to it, either through a Tobin tax or some kind financial industry levy. However, there are different policy objectives and effects for different types of financial industry levies. Adopting an inappropriate instrument can mean the objective is missed or results in unintended consequences, while the costs associated with using the instrument are nevertheless realised.

### *5.1 Financial transactions taxes*

A persistent policy proposal for addressing financial market instability has been to tax transactions in financial market products. For example, Keynes in 1936 proposed taxing bonds (Keynes, 1964, pp. 159-60), Tobin in 1972 suggested foreign exchange (Tobin, 1974), while more recently Professor Krugman (2009) and, Lord Turner (Turner, 2009) chair of the UK Financial Services Authority canvassed the possibility of a similar tax on all financial transactions.

While there are differences in the reasoning behind such proposals, the common thread is that by placing “sand in the wheels” of the financial system, destabilising trades will be reduced and prices will better reflect market fundamentals. For example, Tobin suggests that because destabilising foreign exchange speculation tend to be high-volume and short-term, they would be disproportionately affected by such a tax.

There are a number of problems with this reasoning, including:

- the mobility of financial markets means trades would still occur, just elsewhere (different jurisdictions) or in different forms (such as options), potentially under less regulation;

- there is no clear link between some of the market and government failures that lead to the crisis, and trading volumes; that is there is no link between trading volumes and the creation of systemic risk (for example, credit default swaps – which effectively transferred a lot of risk up from sub-prime borrowers to more secure financial institutions – are generally done over the counter and not traded in secondary markets);
- the tax would apply equally to stabilising as well as de-stabilising trades (if *ex ante* you could tell the difference, you would simply ban the destabilising trades). The proportion of each may be different at different times (which is why, for example, regulators tend to restrict short selling of financial stocks only at times of financial crises). The tax would apply indiscriminately to transactions that are socially useful – including those that contribute to financial system stability – and those that are costly;
- there is no evidence that destabilising trades are more responsive to tax than stabilising trades – to the extent that “raiders” are less responsive to tax than “smoothers”, the tax might increase volatility. Indeed, transaction taxes tend to reduce the number of trades,
- there would be real economic distortions. For example, large, vertically integrated businesses use fewer transactions to make the same product and would pay less tax. Even if levied at a low rate, a tax would cause some impediment to real activity (for instance, currency transactions are essential for international trade and investment).

There appears little practical ability to introduce a financial transaction tax that improves financial market stability, not the least because the conceptual case itself is unclear.

## 5.2 Financial levies

The first step when assessing whether a levy is appropriate is to be clear about its policy purpose. Some objectives of financial levies include:

- reducing systemic risk;
- recovering the costs of government assistance provided after the collapse of financial firms; and
- taxing economic rents due to a heavily regulated and subsidised (either explicitly or implicitly) financial sector.

Policy makers should be clear about the policy purpose because each objective requires a different policy design. Indeed, the objectives can actually be in direct conflict. For example, a levy aiming to reduce systemic risk will provide less revenue the more it “works” in changing behaviour, so it should not be relied on to finance government bailouts. In contrast, a tax on economic rent should leave the incentives in the financial system unaffected, since it explicitly tries to avoid changing marginal behaviour. Finally, a levy used to cost recover government financial assistance could apply to firms with large potential liabilities deemed worthy of covering, but which inherently have no implications for systemic risk.

One problem with using a levy to protect the *system* against a financial shock is that there are a number of potential sources of such risk in financial markets. Some may be generated by markets, such as increasingly complex financial transactions effectively hiding systematic relationships between financial returns from different assets. Agency problems may contribute to this, since financial managers may be more focused on short-term remuneration related returns over more stable investments with long term returns. But it is often difficult to determine *ex ante* what transactions undertaken by profit-seeking individuals improve financial risk management and which are more likely to harm it. Governments can also be sources of systemic risk.

Risk-based fees are used by some regulatory agencies (such as the Australian Prudential Regulatory Authority) to cost recover their expenses. Extending the principle would see these fees

rise proportionate to the social costs of the activities of these financial firms, rather than the regulatory costs. The IMF (2009a, p. 43) and Slemrod (2009, p. 4) have noted the similarity with Pigovian taxes on pollution. However, the recent financial crisis poses a number of problems for such taxes. The source of the systemic risk may not be in the (domestic) regulated financial sector. Taxing the domestic financial sector may actually encourage instability by providing more incentive to use external finance sector. The tax rate needs to be set *ex ante*, when the costs are often only apparent *ex post*. For example, few commentators would have thought an insurance company such as AIG was systemically important before the GFC. It is similarly difficult to know what behaviours will cause a future financial shock with sufficient provision to be able to tax it. The externality is unlikely to rise in a consistent way with different types of financial obligations or remain stable through time, making setting the tax rate difficult. There appear other significant difficulties in determining relatively objective measures of systemic risk. One proposal is to measure a financial firms proportionate contribution to stock index falls of more than five per cent (Acharya and Richardson, 2009). Using such a methodology as a basis for taxing systemic risk leads to a peculiar non-linearity where, during such an event, investors will continually bid down the share price of a financial firm by whatever the future levy obligation, leading to more and more significant reductions.

There are likely to be better ways of targeting the social cost of systemic risk than using tax instruments. Instruments which target the marginal behaviours that impose the social costs are likely to be less costly. For example, if agency problems (such as short-termism on asset managers rather than owners) drive the systemic risk, then regulatory reforms targeted at the problem will be less costly (such as greater voting rights on remuneration incentives by shareholders). If the problem is moral hazard by government, it is unrealistic to expect future governments not to intervene in the economy when facing potentially calamitous market failures. But it is not unrealistic for managers to know that they will be fired, shareholder equity extinguished and liabilities severely curtailed should “bail outs” be needed. Clarity about the costs likely to be imposed on managers and owners before a shock may be more effective means of ensuring they do not become a crisis.

Levies that aim to *recover costs* may appear “equitable”, particularly following a financial crisis that has seen the commitment of significant government revenues. But it is far from certain that those who pay a financial levy are the same ones who benefit from financial market interventions. First, who actually bears the burden of the levy depends on economic incidence, which may be different during a crisis (when the spending is made) compared to after when the tax is paid. Financial markets also capitalise the benefits and costs of policies into the value of financial asset. The owner of a financial asset when a government support program is announced (or is expected) gains, and they may be different to the owners of the same financial asset when a tax is announced. Second, the beneficiaries of the support also presumably include the wider economy, rather than simply financial asset holders.

More importantly, such levies are likely to be inefficient and may even increase instability. Unless the levy itself reflects the potential risk of default, it is likely to be a high cost way for the government to finance such guarantees – effectively taxing relatively “safe” firms to pay for “risky” ones. The most common form of such a levy is to fund deposit insurance. Deposit insurance may improve financial stability by reducing the incidence of bank runs. However, it is the guarantee, rather than the levy which potentially improves stability. While a single, unexpected capital levy (on any sector) may be efficient, the prospect of ad hoc and recurrent capital levies on the financial sector is likely to harm economic growth in the long run.

Further, by affecting how firms take on risk, the levies can increase financial instability. For example, applying a tax to covered liabilities means financial firms are more likely to rely on alternative financial instruments not subject to the tax. Ironically, this mirrors the regulatory

incentives preceding the crisis, where banks used derivatives to maintain risk while reducing their borrowing costs by ring-fencing liabilities in off-balance sheet subsidiaries (Lloyd, 2009, p. 3). Rather than taxing pollution, the tax may actually be causing more pollution. Further, going into a financial crisis, the prospect of higher taxes on financial firms that survive (in order to finance the bailouts of those that don't) is likely to increase financial market instability. Even a recurrent capital levy is likely to be inefficient since businesses that are systemically risky pay the same rate as those that are not. Instead of targeting the marginal social cost of a firm's contribution to systemic risk, levy rate is usually set to recover the cost of interventions (for example, Sweden's prospectively and the US proposal is retrospective). This makes them an inefficient source of financing.<sup>4</sup> In principle, the least cost means of raising the required revenue should be preferred.

One alternative would be to require financial institutions to buy credit default insurance deposits on secondary markets. This would result in more risky financial firms paying higher fees, providing price signals to consumers. Such insurance would only be effective in cases of limited financial system failures (say, for individual firms), rather than for comprehensive global financial collapse.

There may be one area where recent events have increased the case for tax reform. If some form of (implicit and explicit) guarantees persist, along with new financial regulations, financial sectors may be typified as having subsidies and barriers to entry, increasing the potential for excess profits. For example, in Australia, the closing of much of the mortgage origination market has effectively eliminated the competition to the four major banks in providing bank finance. Some options for recouping this economic rent are discussed below.

## 6 Potential tax policy reforms

The previous sections outlined a number of areas where the tax system may have contributed to the key vulnerabilities in the financial system. In this section we highlight a number of tax policy reforms options that could be used to reduce these issues. Many of these options were also outlined in the recent Australia's Future Tax System review (Henry, 2010).

Rather than financial sector specific taxes, governments could instead consider reforms that address underlying risk misallocation in the economy, many of which relate to the tax system.

### 6.1 Addressing the corporate debt bias

There are a number of options that could be used to reduce the bias towards debt at the company level. For example, options such as the comprehensive business income tax system business or business level expenditure taxes (such as cash flow taxes and allowance based system) would either eliminate or significantly reduce the current bias towards debt.

### 6.2 Comprehensive business income tax

The comprehensive business income tax (CBIT) was originally proposed by the U.S. Treasury (1992). The CBIT aims for financial neutrality by abolishing the deductibility of interest. A broadening of the company tax base may allow the company tax rate to be reduced.

<sup>4</sup> Pre-funding may actually introduce an additional uncertainty into financial markets since governments are likely to face increased incentives to bail out firms, even those for whom the funds are not ear-marked.

Introducing the CBIT would mean denying interest deductibility for existing loans. While it may be possible to phase this in over a number of years, this could further increase the vulnerability of highly leveraged firms, placing them at in further financial distress. In addition, denying interest deductibility could also increase the cost of debt financed from foreign investors.

The CBIT has not been formally adopted in any country, although there have been partial steps taken in some countries to limit interest deductibility (for example, Germany).

### 6.3 *Cash flow taxes*

The cash flow taxes, as discussed by the Meade Committee (1978), allow full expensing of investment in the year capital goods are acquired while, like the CBIT interest expenses are not deductible. In effect the government finances a fraction of investment equal to the tax rate. At the same time the government receives a fraction of all future cash inflows from the investment. Like the CBIT, as the cash flow tax is neutral towards debt and equity as the tax liability is independent of how investment is financed. Cash flow taxes only tax the above normal returns and as such are neutral to real investment decisions at the intensive margin.

There are various forms of cash flow tax. They can be imposed on a source base, or destination base (as suggested by Auerbach, Devereux and Simpson, 2009).

However, like the CBIT, because it abolishes interest deductibility, it raises a significant transitional problem for existing debt.

### 6.4 *Allowance for corporate equity*

The allowance for corporate equity (ACE) was proposed by the Capital Taxes Group of the Institute of Fiscal Studies (1991). Variants of the system have been tested in Croatia (Keen and King, 2002), Brazil (Klemm, 2007), Italy (Bordignon *et al.*, 2001) and in Austria (OECD, 2007, p. 130). More recently, an ACE system has been introduced in Belgium (Gérard, 2006) and Latvia.

Like the CBIT, the ACE is a sourced-based tax, but while the CBIT denies deductibility for interest the ACE eliminates the tax bias in favour of debt by allowing a company to deduct an imputed normal return on their equity, in addition to the deduction for debt. The ACE therefore only taxes rents, or profits above the required rate of return. The ACE is in effect similar to the “R+F” cash flow tax as outlined by Meade (1978), and therefore, like the cash flow tax, also does not distort real investment decisions at the intensive margin.<sup>5</sup>

As the ACE effectively narrows the company tax base it is often argued that it should be combined with an increase in the company tax rate. However this need not be the case. As highlighted in Sørensen and Johnson (2010), as the incidence of a company income tax is passed onto less mobile factors, such as labour and land through the taxing the normal return, the revenue loss from the introduction of an ACE could be funded by increases in taxes on these factors. In fact, as these factors carry more than the full burden of the company tax on the normal return, they would still be better off.

Furthermore, the immediate revenue impact of moving to an ACE-based system can be mitigated by only providing the allowance for new equity. That is, by setting the initial equity base for which the allowance is calculated to zero. This approach maximises the boost to equity financed investment for each dollar of revenue forgone. However, setting up an ACE-based system in this

<sup>5</sup> Unlike a conventional company income tax system, under the ACE there is no distortion from accelerated depreciation. Any mis-measurement of profit is offset by a corresponding change in future allowances.

way may require complex anti avoidance provisions to prevent entities from re-characterising existing equity as new equity.

### 6.5 *More neutral treatment of savings income*

The previous options to reforming the company income tax system would not however address all distortions to financial decisions. There are still considerable distortions at the personal level, particularly in relation to the taxation of capital gains and housing.

Sørensen and Johnson (2010), who consider options for the fundamental reform of Australia's capital tax system, recommend consideration be given to introducing an ACE at the corporate level combined with a broad based dual personal income tax.

Dual income taxes have been introduced in its purest form in the Nordic countries, and combine progressive taxation of labour income with a low flat uniform rate on capital income.

Sørensen (2009) outlines a number of reasons for adopting a dual income tax. A flat tax reduces lock-in effects of a realisation based capital gains tax system under progressive taxation, whereby taxpayers can be pushed into a higher tax bracket when large gains are realised. A flat tax on capital income eliminates tax arbitrage opportunities where individuals exploit differences in marginal tax rates.

A low rate dual income tax may also allow for the tax base to be expanded to include currently exempt or concessionally taxed activities. Where concessions cannot be removed, for example due to political concerns or administrative difficulties, a move towards a dual income tax would reduce the relative attractiveness of the activities outside the system.

Under the model proposed by Sørensen and Johnson, all savings income would be taxed at a low flat rate. Australia's dividend imputation system would be replaced with the ACE, providing double tax relief at the corporate level.<sup>6</sup>

By providing a more symmetric treatment of expenses (such as interest) and capital income would reduce, and possibly eliminate the current biases towards debt financing investments, and consequently the incentive for individuals to take on too much risk. Such arrangements would also reduce concerns that the current arrangements may in fact amplify the volatility of the housing market which could in turn add to macroeconomic instability.

Returns from listed shares, would be taxed under the dual income tax with capital gains taxed on a mark to market basis (eliminating the lock-in effect). Thus the normal return on equity, (which is exempt from tax under the ACE) would be taxed at the dual income tax rate, and any economic rents would be taxed twice once in the company and again under the dual income tax.

### 6.6 *The taxation of housing*

The dual income tax could also be applied to housing. Sørensen and Johnson, proposed using the risk free return method (RFRM). Under this method the returns from saving through investment property or owner occupation is deemed on the either the net value of the property or gross value with a deduction for interest expenses.

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<sup>6</sup> This would further reduce the revenue loss from the introduction of an ACE, and reduce the complexity of the tax system.

A deeming approach to taxing property could replace existing transaction based taxes on housing, improving how the tax system impacts on housing, particularly reducing the susceptibility of financial markets to housing lead shocks.

#### 6.7 *Improving loss utilisation*

In an ideal world losses would be made fully refundable. However, full refundability opens the tax system to increased opportunities for tax evasion.

In Australia, there are a number of options that could be considered to improve loss utilisation, and to reduce distortions arising from the current arrangements which favour particular forms of risk taking.

Many countries currently have loss carry-back arrangements. Under loss carry back firms can offset current year losses against tax paid in a prior year. Loss-carry back, like full refundability but to a lesser extent, would act as a microeconomic stabiliser. While this would free up loss utilisation, on its own it may further distort risk towards larger ongoing firms and away from start-ups and entrepreneurs who are less likely to have paid tax in previous periods.

In response to the GFC a number of countries extended (or introduced) loss-carry-back provisions, including the United Kingdom and the United States.

Another option could be to allow losses to be carried forward with interest. This would ensure losses maintain their real value and if combined with a relaxation of utilisation rules would have a similar impact to full refundability. This option would however have a significant cost to revenue, and if the current income tax system is maintained, would increase the debt bias, as the present value of losses arising from interest deductions would be preserved.

## 7 **Conclusion**

While tax policies did not cause the global financial crisis they are likely to have at least contributed to key vulnerabilities in financial systems. Introducing new taxes on the financial system appears to some to be one of the main means for addressing financial market instability. This is even more incongruous when one looks at the existing tax biases that distort the allocation of risk and increase the complexity of the financial system. Rather than the “new”, there appears significantly greater chance of success from attempting reforms to the “old”.

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## COMMENTS ON SESSION 2 FISCAL IMPULSE

Yngve Lindh\*

In this session on Fiscal Impulse it is my task to discuss the two papers “Fiscal Policy and Macroeconomic Stability: New Evidence and Policy Implications”, written by Xavier Debrun and Radhicka Kapoor, and “Fiscal Stabilisation Plans and the Outlook for the World Economy” by Patrick van Brusselen. Before I comment on the two papers, I will make three short remarks. A first remark on the definition of fiscal impulse, a second on the fundamental macroeconomic modelling the analyses in the two papers build on, and a last remark on the data used in the two papers.

### Definition of fiscal impulse and fiscal impact

What is the definition of *fiscal impulse* and how do we distinguish between *fiscal impulse* and *fiscal impact* (*effects of fiscal policies*)? In the organisations *Interim Economic Outlook* in March 2009, the OECD made an attempt to measure the fiscal impulses member state governments implemented following in the wake of the economic and financial crises. The OECD, in their analyses used a “down-up” approach. The method was to add policy initiatives on the expenditure and income sides of the budgets, that governments put in place to hamper the effects of the crises on growth and employment. However, these measures of fiscal impulse was also open to some criticism. It was not in all cases obvious which policy initiatives that should be included. For instance, policy initiatives that was taken before the crises, for instance in budget proposals early in the autumn 2008, and which had positive effects on growth and employment during 2009 and 2010, should they be included? This became a matter of choice. An alternative way to measure fiscal impulse could be to use a “top-down” method by measuring the effect on structural budget balances of single fiscal instruments or packages.

The *impact* or *effect* of fiscal policies, on the other hand, are the effects a certain fiscal impulse has on GDP or other macroeconomic variables. Such effects could be measured either by econometric methods or by using macroeconomic simulation models. As I see it, the two papers by Debrun and Kapoor and by Van Brusselen more analyse fiscal impact of fiscal policies than fiscal impulse.

### Macroeconomic framework

Both papers lean on *best practices* concerning macroeconomic modelling, the *New Neoclassical Synthesis*. These models, for instance highly sophisticated Dynamic Stochastic General Equilibrium models, combine general equilibrium logics with Keynesian rigidities. An important feature is that market forces tend to move model economies towards equilibrium after shocks.

In the aftermath of the recent economic and financial crises these models have been put a bit in question, although, it must be admitted, so far no comprehensive alternatives has been developed. Leijonhufvud (2009)<sup>1</sup> discusses some of these problems and he proposes that “*Within some corridor around an equilibrium time-path, the usual adaptive market mechanism would*

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<sup>1</sup> Leijonhufvud, A. (2009), “Macroeconomics and the Crisis: A Personal Appraisal”, CEPR, Policy Insight, No. 41.

*operate to coordinate activities (Models building on New Neoclassical Synthesis are adequate to use (The author's remark)). But further away from equilibrium effective demand failures would impair the systems ability to restore to a coordinated state".* An interpretation and "application" of such ideas could be that in the current crises situation non-linearities are prevailing and multiple-equilibriums could materialize that could be characterised by high unemployment equilibrium.

One such problem could be related to levels of public debts. Somewhere, there is a limit on how high debt levels could rise and still getting Keynesian effects from discretionary fiscal policy initiatives. Above a critical level, fiscal stimulus could have totally different effects compared to under that level, even effects with opposite sign. In such cases multipliers has turned non-linear.

### **Data from the great moderation period**

Data used in Debrun and Kapoor's analysis, and which is lying behind parameters in Van Brusselen's model, origins partly from the time period of the "Great moderation". It is plausible that the very deep crises will change several economic relationship, also even after new equilibrium-paths have emerged. Increased capital-costs because of on average higher risk premia and long-term interest rates could have such effects. Labour market relationships such as the Okun's law are other candidates for changes. This would also in the end influence effects of fiscal policy. It would be reasonable to be cautious in using estimates of automatic stabilisers and multipliers from earlier periods – but we have no choice. Both Debrun and Kapoor and Van Brusselen are aware of these uncertainties.

### **Comments on "Fiscal Policy and Macroeconomic Stability: New Evidence and Policy Implications" by Xavier Debrun and Radhicka Kapoor**

Having the reservations stated above in mind, it must be underlined that the paper by Debrun and Kapoor is a very competent piece of work. They analyse the empirical link between fiscal policy and macroeconomic volatility. The relationship is complex, especially related to the size of governments, the degree of development of economies and the maturity of financial markets in single economies.

The results are interesting. Debrun and Kapoor find that automatic stabilisers contributes to stability in all types of economies, but stronger so in OECD countries than in non-OECD countries. In earlier empirical work in this area this was not the result for developing countries. Credible monetary policy, and in what extent consumers have access to credit, seem to contribute to stability, according to the results. However, fiscal activism that is not related to the cycle induce cyclical volatility. Improved maturity of financial markets seems to have foster stability, especially concerning consumption.

On the issue of fiscal activism not related to the cycle it would have been interesting if some examples had been discussed. Could that result for instance refer to structural reforms that were not well timed related to the cycle? Another possibility could be policies related to the political cycle. A third possible example are initiatives implemented on the bases of forecast errors.

An interesting result is also that well formulated monetary policy frameworks are stabilising. Such frameworks are in Debrun and Kapoor's empirical analyses approximated by an index of central bank independence.

The result concerning the degree of maturity of financial markets and stability, is of course partly dependant on data from "the Great moderation" period. If this empirical analyses will be

updated in a few years from now, and with data also including the crises period after 2007, I am not so sure this result will prevail.

A possible extension of the analyses would be to test if the introduction of fiscal frameworks and independent fiscal institutions could have had stabilizing effects on economies. These types of frameworks and institutions have been more and more prevalent over the last decade. I believe it would also in the case of fiscal frameworks be possible to construct indices that could be used in the type of econometric analyses Debrun and Kapoor carries out. In construction of such indices there are of course pit falls. For instance, labelling a policy rule “expenditure cap” could have very different interpretations in different countries. Such rules could be tough or soft and of different time spans. The same goes for independent institutions for surveillance of fiscal policy. They are in different countries very different “animals”.

A very interesting result is that fiscal impulses, not systematically meant to stabilise output, undermine the benefits of central bank independence. My interpretation of this result is that it is important that fiscal policy, at least in “normal” times, paves the way for monetary policy by keeping fiscal policies prudent. This “policy mix” gives the best effect on stabilisation. I fully support Debrun and Kapoor’s conclusion that *“one practical way to do so is subject budget preparation to quantitative objectives or even binding constraints defined in terms of structural balance or expenditure ceilings.”* The successful handling of stabilisation policies in Sweden, before and during the current crises, builds on a rather strict fiscal framework.<sup>2</sup>

### **Comments on “Fiscal Stabilisation Plans and the Outlook for the World Economy” by Patrick Van Brusselen**

In his paper Van Brusselen takes a broad grip on the issue of the impact of fiscal stabilisation plans in the crises and longer run prospects of the major economies in the world. The paper starts with a competent discussion of elements underlying the concept of fiscal multipliers. Based in conventional macro theory, the size of multipliers also in extreme situations such as when credit crunch is prevailing (liquidity trap-situations), are discussed. Van Brusselen’s first conclusion, drawing on his studies of the literature, is that both monetary and fiscal policies have roles to play and that fiscal policies are more potent in “liquidity trap situations”. The task for monetary policy in such situations is to support expectations of positive inflation. His fear is that the US, the UK and the Euro area are all rapidly moving into zero interest rate and, possibly, deflation territory (page 262).

A reference to the failure of fiscal policy in Japan aimed at drawing Japan out of stagnation, should, in my view be a bit qualified. The Japanese stimulative fiscal policies in the 1990s could have been less well targeted. Well targeted public investments and tax reforms could have shown to have been more effective.

On optimal designs of fiscal stabilisation programmes Van Brusselen states that in situations of deep crises, fiscal policies has a role to play to prop up demand. The famous three Ts are the principles to obey to in such cases. Two comments: To begin with, it seems that most governments introduced fiscal stimulus in a timely fashion in 2008/2009, but when it now comes to exit from the stimulus uncertainties make timing and sequencing problematic. Secondly, in many stimulus packages there are elements of permanent measure. This goes especially for tax cuts, which could

<sup>2</sup> For description and discussion of the Swedish fiscal framework, see Hansson-Brusewitz, U. and Y. Lindh (2005), “Expenditure Ceilings and Fiscal Policy – Swedish Experiences”, in *Public Expenditure*, proceedings of the 7<sup>th</sup> Banca d’Italia’s workshop on Public Finances, and Lindh, Y. and G. Ljungman (2007), “Fiscal Rules and Scope for Stabilisation Policy – The Case of Sweden”, in *Fiscal Policy: Current Issues and Challenges*, proceedings of the 9<sup>th</sup> Banca d’Italia’s workshop on Public Finances.

be expected to have more of longer term efficiency gains compared to temporary stimulation effects. In the aftermath of the crises it will be interesting to see research on the effects of such measures. Could such measures for instance improve growth rates in the up-turn after the crises?

Van Brusselen's conclusion in this part of the paper is that fiscal packages should be tailored to individual countries depending for instance on conditions such as openness of economies and of initial government debt levels. Such conditions give different room for manoeuvre for governments. This conclusion could only be supported, but it should be added that some coordination in time between countries policies could strengthening the impact of the packages. It must also be added that in some really severe cases, governments must stick to tough, transparent convergence plans, even if basic conditions change. Such examples are Sweden in the 1990s and Greece today.

On the evaluation of the sizes of fiscal multipliers Van Brusselen carries out a very comprehensive overview. He reports on attempts both with what he calls "the narrative record evaluation" which I interpret as "down-up" methods where discretionary and automatic measures are aggregated separately and then together. Other methods are estimations of VAR-models and lastly, simulations by using macroeconomic models and especially DSGE and other general equilibrium models.

In a large part of the paper Van Brusselen reports simulation results carried out with the NIME model, a world model grounded in the "New Neoclassical Synthesis". By using this model Van Brusselen evaluates the size of multipliers in the euro area, effects of fiscal plans in the euro area and in the US and presents macro economic projections for the major world economies up to 2018. This is an impressive piece of work.

However, although the NIME-model is presented in detail in earlier documentations, as a reader I would have appreciated some more of technical descriptions of the model also in this paper, for instance in a technical appendix. That could have made the interpretation of the results a bit easier for the reader. For the analyses of effects of fiscal policies it is important how a model handles variables and relationships such as monetary policy targets and reaction functions, exchange rate/trade elasticities, liquidity constraints, production functions and formation of expectations. These matters are not much discussed in the paper.

Van Brusselen uses the NIME-model for simulations of the effects of the stimulation packages in the Euro area and in the US for the short and medium terms (up to 2015). The results are interesting. In the euro area, there is a positive effect on GDP, compared to a base line scenario, although this effect fades away after some years. Employment, however, decreases somewhat towards the end of the period, which seems to more or less counteract the positive effects in the first years. The fiscal position deteriorates compared to baseline and so does current account. In my view these are reasonable results and points to the need to rise potential output growth in Europe by structural reforms.

For the US, the policy package induce a more negative effect compared to base line than the results for Euro area. However, budget deficits and current account develops closer to base line. In a comparison it is shown that the NIME model gives a somewhat more negative growth path than that projected by the CBO in the US. As Van Brusselen points out, this shows that there are great uncertainty about the results. Not least the different measures of multipliers that are used.

In simulations for the longer term (up to 2018) Van Brusselen finds that the Euro area's growth prospects are bleak (approximately 1 percent per annum), inflation will be positive but low (1 per cent) and public debt will reach almost 130 per cent of GDP. For the US growth prospects are better (approximately 2 per cent), but this is lower than in recent history. The most striking result is the very low inflation in the US, almost close to zero. This seems to be an affect of

increased unemployment, and fall in real private take-home wage. At the same time public debt is projected to reach over 140 per cent of GDP in 2018, but the current account deficit shows a stable path. Policies to avoid these development are of course necessary in both the Euro area and in the US.

In the end of the paper Van Brusselen discusses in an interesting way a range of uncertainties around his results. Uncertainties are related to the timing of exit strategies, to adjustments of balance sheets of banks, households and firms and to possible protectionism. Uncertainties are also related to which economy will be the growth engine of the world economy in the coming years and related to that, to demand policies in the large economies, also to the development of international coordination, to the effects implementation of stricter financial regulations and not least to the development of future potential output in our economies. It is difficult not to support the author on all these uncertainties and also that we are living in a very uncertain phase of economic development of the world economy.





## COMMENTS ON SESSION 2 FISCAL IMPULSE

Daniela Monacelli\*

### 1 The assessment of fiscal impulse in the recent crisis scenario: A comment

The current debate about discretionary fiscal policy was somewhat stimulated by the fiscal action policy makers put in place to support economic activity during the recent crisis. Action came before theory. *The Economist* describes this situation bluntly: “It is the biggest peacetime fiscal expansion in history. Across the globe countries have countered the recession by cutting taxes and by boosting government spending. The G20 group of economies ... have introduced stimulus packages worth an average of 2 per cent of GDP this year and 1.6 per cent of GDP in 2010. Coordinated action on this scale might suggest a consensus about the effects of fiscal stimulus. **But economists are in fact deeply divided about how well, or indeed whether, such stimulus works**”.<sup>1</sup> The last sentence sounds like a slap in the face of the economists for having been unable to get a sense of the policies needed to counteract crisis and for leaving policy makers to play it by ear.

After a dominance of policy advice based on models featuring frictionless markets and inter-temporally optimizing forward-looking agents (where any expenditure expansion would eventually give rise to increases in taxes and therefore to negative wealth effects and decreasing private consumption), to the external observers the revival of fiscal multipliers may actually look like a paramount switch in the profession’s perspective or a nostalgic comeback of old-fashioned views.

Past wisdom inherited from the ’80s fixed the focus on “normal” and “peacetime” concerns about real business cycle and definitely established the failure of discretionary fiscal policy for stabilisation purposes (due to implementation lags, small multipliers’ size, etc.). Policy makers were even warned against possible destabilising pro-cyclical effects from its misuse. The widespread scepticism on the ability of fiscal policy to work as a stabilisation instrument emphasized the role of automatic stabilisers and shifted the focus on long term budgetary outlook.<sup>2</sup> This view has not changed, basically: at the beginning of the recession, when the issue of discretionary fiscal policy re-emerged in the debate, the old concerns were firmly restated: “*Fiscal stimulus is critical but could be counterproductive if it is not timely, targeted and temporary*” (Summers, 2007). The resort to fiscal policy was primarily envisaged as a consequence of the reduced efficacy of monetary policy in low interest conditions and in a liquidity trap situation.<sup>3</sup> What has changed in the meantime is the perception about the seriousness of economic context, particularly the depth and the duration of the crisis (Auerbach and Gale, 2009), and about the nature of the current recession, which – contrary to the previous crises of the ’70s and the ’90s that were supply side induced – is demand side driven (Röger and in ’t Veld, 2009). Under these

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The views expressed here are those of the author and do not necessarily reflect those of Banca d’Italia.

<sup>1</sup> From *The Economist* (2009a), our bold.

<sup>2</sup> See, for instance, Blanchard, Dell’Ariccia and Mauro (2010), pp. 5-6.

<sup>3</sup> “If policymakers are able to act quickly and effectively, fiscal policy can work more rapidly than monetary policy, which has about a lag of a year between the change in the federal funds rate and its maximum impact. Moreover, the efficacy of monetary policy may well be diminished by capital constraints that limit the ability of banks to lend or by creditworthiness constraints that limit the ability of businesses to borrow. As important, the extent to which monetary policy can be prudently used in the current environment is limited by concerns about the dollar as well as about the bubble creating effects of very low interest rates. Finally certain problems – such as the impact of mass foreclosures on affected communities – are not easily amenable to monetary policy.” (Summers, 2007).

circumstances a return to fiscal policy as a macroeconomic tool sounds somewhat less contradictory: *“some of the past problems in using fiscal policy to stimulate demand may be less an impediment in the current circumstances”* (Feldstein, 2009).

As a matter of fact, the disagreement among the economists *“about how well, or indeed whether”* fiscal stimulus may work is more a signal of the **difficulty in reconciling theoretical and empirical results consistently enough**. Such difficulties were already a concern of the economists before the crisis imposed the issue of sustaining the economic activity in the policy agenda, but they were still unsolved. The last wave of New Keynesian models may be interpreted precisely as an attempt to reconcile theoretical predictions with empirical analysis, by neutralising in macroeconomic models the negative response of private consumption to government expenditure shocks as a result of rational expectations and Ricardian behaviours inherited from the micro-foundations. The key mechanisms to this aim are found in real frictions and nominal rigidities, that allow real wages to increase, and devices to obstruct, somehow, the working out of negative wealth-effect<sup>4</sup> (e.g., liquidity constraints that prevent at least some agents from optimising their consumption choices).

Some authors depict the current status of the art in macroeconomics as the result of a **philosophical divide between two opposite approaches**, more than a stage in the evolution of macroeconomics.<sup>5</sup> One is a “theory first”/Walrasian approach, which *“sees the macro economy as a system that we can best understand through the lens of formal micro-founded theory”* (Colander, 2009) and *“insists on a complete theoretical model of the phenomena of interest prior to data analyses”* (Campos, Eriksson and Hendry, 2005); it has recently flown into DSGE models. The other is a “reality-first”/VAR family approach, which *“sees the macro economy as more complex than that and does not see a rigid microeconomically grounded theory as especially helpful in shedding light on most macroeconomic problems”*<sup>6</sup> since the economy is *“a complicated, dynamic, nonlinear, simultaneous, high dimensional, and evolving entity”* due to continuous changes in social systems, laws, technological innovation, etc.<sup>7</sup> The divide, in Colander opinion, opposes US and European schools, with the US “theory-first” approach prevailing, primarily due to a “publish or perish” selection mechanism in journals publication that encourages the profession to invest more in assumptions based modelling and less in complex and judgemental demanding data analysis.<sup>8</sup> One less extreme position could recognise that both approaches are needed and both can provide useful insights. The crucial point when tackling the crisis is that policy receipts may be extremely different. The recent debate about fiscal multipliers seems a long way from end.

Auerbach and Gale (2010) summarise the **evidence on the effects of discretionary fiscal policy on economic activity** considering all main approaches in the literature, from the micro evidence on individual agents behaviour (capturing only direct effects), to the macro evidence on overall economy (capturing both direct and indirect effects). On the macro side, the authors distinguish: the large-scale macroeconomic models, that track all the channels relating prices, quantities, and policy variables and are estimated by regression techniques; reduced form SVAR models, that directly relate changes in output to changes in policy variables and are estimated based on assumptions for the identification of fiscal policy shocks and their effects; dynamic general equilibrium models (like DSGE), with relative small number of equations, that are strictly grounded in microeconomic theory and are partly-estimated and partly-calibrated. Limitations of the three approaches are to be found respectively: in the Lucas critique applying to the estimated

<sup>4</sup> For instance, Hall (2009), par. 5.

<sup>5</sup> As, for instance, Woodford (2009).

<sup>6</sup> Colander (2009).

<sup>7</sup> Campos, Eriksson and Hendry (2005).

<sup>8</sup> Colander (2009), pp. 5-7.

parameters of macroeconometric models; in the possibility of SVAR to address policy effects only under the economic conditions prevailing within the sample and if complemented by a “narrative approach”; in the enormously wide spectrum of multipliers DSGE may provide depending on the modelling assumptions (Auerbach and Gale report values ranging from “*the essentially zero estimate provided by Cogan et al. (2009) to estimates in the range of 3 or 4 provided by Christiano et al. (2009)*”). From the analysis of case studies of previous crises (the US Great Depression and the Japanese Lost Decade) the authors conclude that sustained fiscal policy expansion was not attempted in either case and that was to some extent due to the predominance of concerns about the budget over concerns about the state of the economy.

**The debate has therefore shifted on the size of fiscal multipliers.** Multipliers size vary with: *non-fiscal factors* like the size, the structure, the frictions, the openness, and the state of the economy, the interactions of fiscal policy with other policies; *fiscal factors* like, the different channels chosen to inject the fiscal stimulus, the fiscal institutional framework affecting the implementation of the policy, the permanent or temporary nature of the fiscal stimulus, the framing/packaging of interventions (via announcement effects, transparency, etc.); households and firms *behavioural assumptions and potential nominal and real rigidities* in the models that are used to estimate the multipliers (reflecting different micro-foundation).<sup>9</sup> As to the last point, it matters in particular whether agents formulate forward or backward-looking expectations, are Ricardian or non-Ricardian, are subject to constraints on liquidity, borrowing, cash flow, (Galí, López-Salido and Vallés, 2004, 2007; Coenen and Straub, 2005). The size of multipliers also reflects the “*fiscal space*” allowed for more aggressive response by policy makers (Blanchard, Dell’Ariccia and Mauro, 2010) and may be dictated by debt and fiscal sustainability conditions (Corsetti, Meier and Muller, 2010). Another factor that recently attracted the attention of the economists, in the light of the coordinated fiscal expansion strategy undertaken by policy makers, is the magnitude of cross-border fiscal policy spillovers due to changes induced by fiscal shocks in imports, exports, exchange rates and interest rates. These channels act both in positive and in negative ways on the multipliers, and the assessment of the net effect varies according to the modelling of domestic and foreign economies and the underlying assumptions (Cwik and Wieland, 2009; Corsetti, Meier and Muller, 2010).

As Blanchard *et al.* (2010) argue, **there is a lot we still need to learn about multipliers.**<sup>10</sup> However, Spilimbergo, Symanski and Schindler (2009) in the IMF Staff Position Note that gives background information to policy makers on fiscal multipliers, correctly stress that the fiscal multipliers available for some countries “*should be carefully re-examined in the light of current events*”, but they also advice against reestimating their size in the present situation since structural parameters have changed, violating one of the crucial estimating assumptions. They conclude that “*past research on multiplier estimates ... can provide guidance in developing multiplier estimates, but judgement, based on current conditions, is important*”, somehow validating the detachment between economists and policy makers in the current situation.

One relevant issue in this debate concerns the **size of fiscal multiplier under zero interest or liquidity trap conditions**. It probably deserve some more attention. The debate on this topic in the economic literature has revived after the Japanese experience of the Nineties and the US experience in the recent financial crisis. However, “*much of this debate was, explicitly or implicitly, within the context of old-fashioned Keynesian models or the frictionless neoclassical growth*

<sup>9</sup> See, for instance, Hall (2009).

<sup>10</sup> “... the wide variety of approaches in terms of measures undertaken has made it clear that there is a lot we do not know about the effects of fiscal policy, about the optimal composition of fiscal packages, about the use of spending increases versus tax decreases, and the factors that underlie the sustainability of public debts, topics that have been less active areas for research before the crisis” (Blanchard, Dell’Ariccia and Mauro, 2010, p. 9).

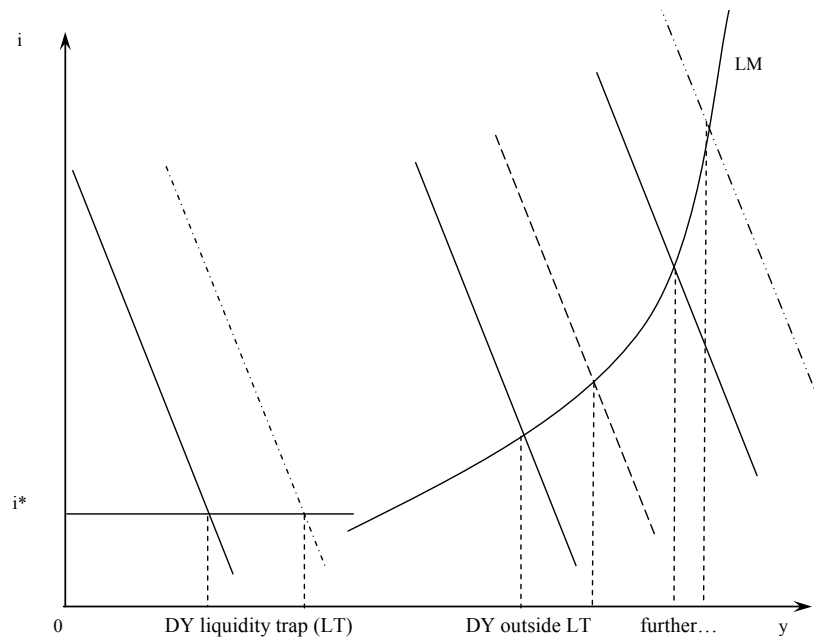
model” (Eggertsson, 2010). The basic idea does not seem to have significantly moved away from Keynes suggestions that fiscal multipliers were likely to be much larger during severe downturns than in normal times (Keynes, 1936). In a simple IS-LM framework, a demand equilibrium occurring in the horizontal (liquidity trap) segment of LM curve implies null effectiveness for monetary policy and maximum effectiveness for fiscal policy and the same shift in the IS curve is associated with decreasing changes in output (Figure 1). The supply side is affected by the choice of fiscal instrument insofar as taxation may interfere with price formation mechanisms, and possibly with expectations.

Eggertsson observes that “the principal goal of a policy at zero interest rates should not be to increase aggregate supply by manipulating aggregate supply incentives. Instead, ... should be to increase aggregate demand – the overall level of spending in the economy. ... At zero interest rates, output is demand-determined. ... policy should not be aimed at increasing the supply of goods when the problem is that there are not enough buyers”. A receipt that closely resembles the Keynesian arguments against Say’s Law and the explanation of the Paradox of Drift.

However, the use of new Keynesian DSGE models may significantly add to our knowledge of the effects of the specific fiscal instruments. For instance, Eggertsson finds that tax cut are effective only in case of temporary reductions of sales taxes and investment tax credit, whereas cutting taxes on labor or capital may prove to be contractionary. As he argues: “policies aimed at increasing aggregate supply are counterproductive because they can create deflationary expectations at zero interest rates”. Erceg and Lindé (2009) find results that “suggest a somewhat nuanced view of the role of fiscal policy in a liquidity trap”. In studying the effects of expanding government spending in a liquidity trap environment they conclude that by allowing an endogenous duration of the liquidity trap, fiscal multipliers depend on the scale of the fiscal expansion: “For an economy facing a protracted recession and for which monetary policy seems likely to be constrained by zero bound for a very prolonged period ... there is a strong argument for increasing government spending on a temporary basis. ... for shorter-lived liquidity traps ... the multiplier is larger than under “normal conditions” for small increases in spending, but drops relatively quickly at higher spending levels.. Thus, larger spending programs may suffer from sharply diminishing returns, and may boost government debt significantly”. As for the state of the art of macroeconomics, pictures are not as clear-cut as policy makers would probably like...

Figure 1

### Liquidity Trap: A Simple IS-LM Representation



Under these circumstances a warning may be particularly useful: “*Convenience, not conviction, often dictates the choices economists make. Convenience, however, is addictive. Economists can become seduced by their models, fooling themselves that what the model leaves out does not matter. ...*”.<sup>11</sup>

## 2 Comment on the papers

**The papers presented in Session 2 give a broad overview of state of the art as reported above.** They provide us with an interesting insight about the difficulties policy maker must confront in these days when approaching the use of macroeconomics to look for policy guidance. The three papers by Kaniovski and Schratzenstaller, Valli Jorge and De Carvalho, and Röger and in 't Veld differ in many respects (Table 1): the first one uses a medium scale macroeconometric model, while the others use DSGE models; it also simulates the effects of policy packages actually implemented by Austria and its main commercial partners *vis-à-vis* the current crises, while the other two present predictions from different fiscal instruments changes, subject to specific fiscal rules.

All of them, however, try to contextualise their own findings in the present crisis scenario: they address common issues like the role of spill-over effects from cross-border flows (in the light of the significant role policy makers attached to fiscal policy coordination in the international agenda) and the need to take on board somehow the peculiar conditions of the monetary and financial markets in the aftermath of the financial crises.

The **Kaniovski and Schratzenstaller** paper is a typical example of macro model simulation. Results from Macromod (the macroeconomic model of the Austrian economy developed at WIFO) are supplemented by the spillover effects from Austria's ten most important trading partners on the Austrian economy, that are estimated by OEF (the Oxford World Macroeconomic Model). The two models are linked so that simulations can take into account both of changes in terms of trade, interest rates and the Euro/US Dollar exchange rate from the OEF World model and of the much more detailed description of the institutional features of the Austrian economy from the domestic WIFO model.

The richness of details about domestic economy is a classical advantage of macroeconometric models and represents the real value added in using this tool for assessing the impact of fiscal policy. Some more description by the authors of the working through of the macro model would therefore be appreciated (possibly in an appendix). Fiscal multipliers reported in the paper are in line with other macro models: for government expenditure are above 1, while for the personal income are around half percentage point (“slightly below”). Inclusion of the economy openness is the main addition.

The spillover effects from the additional stimulus by foreign fiscal packages is estimated to produce an extra gain in real GDP of almost one percentage point from the baseline scenario. In a more detailed description of WIFO model, it would be interesting to understand how spillover work through the single channels, considered in both directions separately, in order to assess whether the policy mix adopted by the states could have been enhanced by a different composition of the packages. In Kaniovski-Schratenstaller paper the role of the crisis in affecting fiscal policy effectiveness is simply mentioned as a background issue. It is not clear, however, whether such an issue is taken care of, and how, in the simulation (what is happening to interest rates? Are they set fixed, or shocked or what else?).

<sup>11</sup> *The Economist* (2009b).

Table 1

### Kaniovski and Schratzenstaller, Valli Jorge and De Carvalho, Röger and in 't Veld Compared

Comparison complex. Papers use:	Röger and in't Veld	Valli Jorge and De Carvalho	Kaniovski and Schratzenstaller
<i>different models ...</i>	NK, DSGE: Estimated; Multi Country	NK, DSGE: Calibrated; Two Country	Macro model: Estimated; (Exogenously) Multi Country
<i>with different assumptions about fiscal stimulus ...</i>	Fiscal Policy reaction function	Fiscal Policy reaction function	Discretionary manoeuvre simulated
<i>under different complementary policies ...</i>	Taylor Monetary Policy Rule	Forward looking Taylor Monetary Policy rule	Short and long term interest rates exogenous
<i>different exercises ...</i>			
<b>Consumption Behaviour</b>			
<b>Household heterogeneity</b> (expectations, constraints, etc.)	<b>Three Households types (with <math>\neq</math> reactions)</b> Ricardian (RIC) have RE (counter-react to policy)  Credit constrained (CC) are RIC + Credit Constraint (optimise but under additional constraint)  Liquidity constrained (LC) followpure Rule of Thumb (RoT) (do not optimise just consume)  <b>Share of each group crucial for multipliers size</b> RIC lowest multiplier; CC higher; LC highest	<b>Two Households types (with <math>\neq</math> characteristics)</b> Ricardian (RIC) have RE with some habit persistence; <b>also</b> high skilled in labour mkt  Liquidity constrained (LC) optimise but cannot access complete financial markets; <b>also</b> low skilled in labour mkt  <b>Share of each group crucial for multipliers size</b> RIC earn more for same hours; LC earn less for same hours	<b>No household heterogeneity</b> No forward looking expectations (apparently)  No micro foundation
<b>Policy</b>			
<b>Fiscal policy feeds private economy:</b>	directly on $RIC \leftarrow B, tc, tw, tk, Tls, itc, TR$ indirectly on $RIC \leftarrow CG, IG$ (supplied by $FF$ ) directly on $CC \leftarrow -B, tc, tw, tk, Tls, itc, TR$ directly on $LC (RoT) \leftarrow tc, tw, Tls, TR$ directly on $Ffinterm, G \leftarrow KG$ (externality)	directly on $RIC \leftarrow B, tc, tw, tN, tk, tD, Tls, TR^*$ directly on $LC \leftarrow tc, tw, tN, Tls, TR^*$ directly on $FF$ (intermediate) $\leftarrow KG$ ( <b>input</b> together with $K_{PR}$ ) affect output (not only via externality) realistic role for public investment indirectly on $FF$ (intermediate) $\leftarrow TR, tw$ (via $vw$ , i.e. bias in favour of Skilled $L$ )	Demand side channels: On the revenue side: personal taxes, business taxes, consumption taxes, social security contributions and a residual category of other revenues. Expenditure traected only as one category
<b>Fiscal policy instruments:</b>	Taxes (except $tw$ ), Investment subsidies ( $\neq$ from Govt. investment) Govt. investment $\rightarrow KG$ (generate externalities)	$TR$ biased towards constrained $HH$ $IG$ responds to $I^*$ $CG$ endogenously derived	Actual Govt anti crisis package simulated
<b>Fiscal rule:</b>	$t_w$ responds to debt target $b^*$ ; on all $HH$ (no $\neq$ labour types across $RIC, CC, LC$ )	$SP$ responds to $B$ and output growth deviations from $SS$ (counter-cyclical)	No fiscal rule mentioned
<b>Spill-over (Cross-border)</b>			
<b>Openess modelling</b>	<b>6-region version of the model</b> bilateral calibration of trade flows open economies (trade channel) exchange rates (Euro Area vs. others) symmetrical behaviour of the two sub-regions	<b>2-country model</b> Brazil vs. RoW (US+EA) Same structural model but different calibrated parameters Symmetric except for policy rules. RoW: Fiscal policy $\rightarrow CG, TR$ tools; $t_{LS}$ adjust to $B^*$ )	<b>Multi-countries model</b> exogenous embed in domestic model no interaction involved (small economy hypothesis) 10 main commercial partners simulate their own packages

The **Valli Jorge and De Carvalho** paper gives an example of policy analysis based on DSGE micro-founded theoretical approach. Their model is very rich, therefore results are complex to interpret and are very restricted by inevitable model-dependence. Fiscal policy modelling is particularly articulated. The set of fiscal channels affecting the economy includes several tax instruments ( $\tau$ ,  $\tau^N$ ,  $\tau^W_h$ ,  $\tau^W_f$ ,  $\tau^K$ , and  $\tau^D$ , i.e. rates of taxes levied on consumption, labour income, social security from workers  $h$ , social security from firms  $f$ , capital and dividends, and expenditure from Government consumption  $G$ , transfers  $TR$ , and investment  $I_G$ ).

The authors attribute an interesting role to government capital  $K_G$ . It directly enters the intermediate good production function as an input with a weight  $\alpha_k$  in the technology, that is interpreted as an indicator of the economy's degree of dependence on government investment, possibly a relevant policy variable. Fiscal authorities follow a primary surplus rule reacting to deviations of public debt and economic activity from their steady state levels and Government consumption is endogenously determined by this rule.

The model embed standard new Keynesian hypothesis of heterogeneous households, distinguished between Ricardian households (RIC, optimising consumption and investing) and Rule of Thumb households (RoT, who only consume all their disposable income and therefore feature higher multipliers). The novelty is in overlapping this consumption heterogeneity with an analogous heterogeneity in labour supply quality: RoT household consume more out of an increase in their wage, but are also less skilled and are paid less for the same amount of worked hours. Interestingly, these features also interact with the use of government transfers as policy instruments for distributional goals, which advantages less skilled workers. The interaction of these assumptions is complex to follow and to assess on qualitative grounds. It would be interesting to disentangle the impact of each channel on the multiplier and explain whether this interaction ends up by increasing or decreasing the size of fiscal multipliers and under what conditions. It could well be the case that the distributional policy play some relevant role.

It seems from the authors discussion that the constrained fiscal framework reduces the impact of the fiscal instruments (government expenditure on investment and transfers), by the implied adjustment of government consumption to raise primary surplus *vis-à-vis* increases in public debt. If this is so, it is not clear why tax rates are not considered as potential endogenous instrument to be adjusted by the primary surplus rule, as well, or whether there is any reason for this choice other than modelling convenience. Another possibility offered by the richness of the fiscal side of the model could be the use of the degree of dependence from government capital as a policy target to be pursued by the public investment policy. By setting investment in order to fulfil a steady state government capital level that corresponds to a desired degree of dependency, policy makers may decide how much private sector may rely on the public sustain. This seems to be a relevant issue for the Brazilian economy, as it can be inferred by some statement in the paper, and could possibly deserve some thought by the authors.

Much attention is given in the paper to the interactions between fiscal and monetary regimes. Maybe some consideration could be added in order to place the current crisis scenario inside the description of the alternative monetary policy rules.

The **Röger and in 't Veld** paper get on board all the three issues addressed in recent literature: the assessment of different fiscal multipliers, the spillovers from cross-border interactions, the impact of the crisis on fiscal policy effectiveness. They use a 6-region version of Röger and in 't Veld (2009) DSGE model.

The most relevant feature of their model is definitely the household heterogeneity assumption: on top of the usual Ricardian (RIC, with the lowest multiplier) and liquidity constrained (RoT) household type (with the highest), the authors consider a third type represented by credit-constrained households (CC). CC households consume and invest in housing capital; they

optimise as the RIC households, but under an additional constraint due to the collateral requirement on borrowing. The consumption rule of CC households is characterised by a higher sensitivity to interest rate. This is captured by a parameter in the Lagrangian multiplier representing the premium on interest rate, related to the degree of tightness from the collateral constraint. The potential effect of this extra constraint on the size of the multipliers is not immediately clear. It presumably depends on the different types of fiscal stimuli and on the way through which they influence the credit conditions and the interest rate. CC multiplier is likely to be higher than Ricardian households' whenever the fiscal impulse may actually generate an extra effect on CC consumption from the loosening of the credit constraint. The authors also assume a higher rate of time preference for CC than for RIC households, *i.e.* more impatience, which presumably helps in raising the consumption multiplier of the overall economy even more. This assumption is not directly related to the credit constraint, but is presumably connected. Some more elaboration on this may help. The relative shares of the different heterogeneous household types, which are crucial variables for the size of multipliers, are calibrated.

Röger and in 't Veld explicitly simulate a crisis scenario by a combination of domestic shocks to the optimality conditions of investment and housing capital through the relevant parameters (for instance in the arbitrage conditions). The set up of the exercise does not involve the share of CC households, which is kept constant; this amounts to distribute the crunch, so to speak, across the same households. One can argue that the simulated scenario would probably ask for a rise in the CC share and that this would presumably produce different results. A higher share of CC households in a crisis scenario would anyway affect the impact of fiscal policy to counteract the downturn, its desired composition, the mix in terms of temporary and permanent measures. Although complex, and probably irrelevant for the equilibrium of the model, the introduction of some link between the share of CC households and the monetary/credit conditions would probably be appropriate in case one wants to use the model to study the behaviour of the economy in extreme crisis scenarios like the present ones.



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## COMMENTS ON SESSION 2 FISCAL IMPULSE

*Galen Countryman*<sup>\*</sup>

These three papers make interesting contributions to the discussion of fiscal policy. The papers by Baldacci *et al.* and Afonso *et al.* explore the important topic of whether fiscal policy can be effective in the wake of a financial crisis. The paper by McDonald and Johnson has a somewhat different angle: it explores how tax policies may have contributed to the recent financial crisis and what policy changes could be made to limit this effect.

### **Comments on “Getting It Right: How Fiscal Response Can Shorten Crisis Length and Raise Growth” by Emanuele Baldacci, Sanjeev Gupta and Carlos Mulas-Granados**

This paper examines historical data to determine what type of fiscal stimuli work best in the context of a banking crisis. The authors find that fiscal expansions are a decisive factor in reducing the duration of banking crises. However, they note that different fiscal stimuli have different effects and that there is a trade-off between short-term and medium term objectives. To spur recovery in the short-term, the fiscal stimuli need to be of the sort that can be implemented rapidly. In this regard, tax cuts, particularly consumption tax cuts, as well as government consumption are found to work best. However, some of these instruments are not as effective in contributing to long-term growth. For instance, spending on infrastructure and other capital, which given the lead time for implementation, doesn't have much of an impact on shortening a crisis but was particularly effective in contributing to long-term growth.

The authors also demonstrated empirically that having a sound fiscal position before the crisis hits is important since it provides governments with the flexibility to use fiscal policy to mitigate the effects of a banking crisis. Indeed, the authors find that high-debt, low-income countries have a harder time recovering from the crisis since their ability to resort to fiscal policy is limited.

This paper makes an interesting contribution in exploring the choice of fiscal stimuli to combat the effects of a financial crisis. An interesting extension of this analysis would be to examine the choice of fiscal measures and their effect on long term fiscal sustainability. In this context, time-limited spending may have an advantage over tax cuts, which tend to be more permanent.

### **Comments on “Fiscal Policy and Growth: Do Financial Crises Make a Difference?”, by António Afonso, Hans Peter Grüner and Christina Kolerus**

The paper by Afonso *et al.* empirically explores the question of whether fiscal policy works differently in a financial crisis versus a “regular” recession. The authors find that there is no statistical effect to show that fiscal policy is any more effective in a financial crisis than during a non-financial one. Indeed, they find that fiscal multipliers are relatively small.

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The views expressed here are those of the author and do not necessarily reflect those of the Department of Finance, Canada.

While this paper addresses an important question, it is limited by the fact that it does not control for the monetary policy stance at the time of the crisis (indeed, it may not be possible due to data limitations). A key aspect of the current crisis was that monetary policymakers were quickly running out of tools – what we now refer to as the “zero lower bound”. Indeed, another paper presented in this session by Röger and Jan in ’t Veld suggests that fiscal multipliers are in fact larger during financial crises.

**Comments on “Tax Policies to Improve the Stability of Financial Markets” by Jason McDonald and Shane Johnson**

The paper by McDonald and Johnson explores how long-standing tax policies common to many countries could have been a factor in the latest financial crisis. These policies include interest deductibility, which leads to a bias towards debt financing, and the preferential treatment of owner-occupied housing, which creates an incentive for individuals to invest in housing versus other investment vehicles. The authors provide a good qualitative summary of the relevant policy issues, and in the last part of the paper, propose some possible reforms. Such reforms may be difficult to achieve, given that they often involve transitional costs or the loss of preferences by certain groups of taxpayers.

The draft of the paper presented at the conference included a middle section discussing financial transaction taxes and their ability to reduce systemic risk, recover the costs of government assistance provided after the collapse of financial firms, and tax economic rents in the financial sector. Given recent proposals concerning the taxation of financial institutions, this discussion is quite timely. The authors provide a good discussion of the issues involved and conclude that proposals to tax financial transactions pose a number of challenges. In particular, some taxes may not achieve their desired outcome.

This paper provides a very good review of tax policies and a reminder of how these rather microeconomic policy instruments can have profound macroeconomic effects. My one comment on this paper is that middle section on financial transaction taxes, while useful, seems out of place with the rest of the paper. Consideration should be given to turning this section into a separate paper or finding a way to better integrate this section into the rest of the paper.

### **Session 3**

## **FISCAL POLICY AND FISCAL RULES**



# THE GREAT CRISIS AND FISCAL INSTITUTIONS IN EASTERN AND CENTRAL EUROPE AND CENTRAL ASIA

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## 1 Introduction

In the years prior to the onset of the great crisis of 2008, high growth rates and a favorable external environment led to a decade of promising fiscal developments for countries in the Eastern and Central Europe and Central Asia (ECA). They saw an unprecedented increase in fiscal resources as tax revenues burgeoned with accelerating growth rates. Public debt fell dramatically as a share of GDP. But rising revenues also meant that fiscal expenditures could grow; while expenditure growth rates were below those of revenue, they were still high, especially since the mid 2000s. The size of government did not fall, but rose in many cases. At the same time, for a large majority of the countries under consideration, the last decade saw the consolidation of deep institutional reforms, starting in many cases in the early 1990s, which aimed to dramatically change the way in which public expenditures and revenues were handled. Against this backdrop, came the global crisis and the impact on growth in ECA countries was severe. Consequently, fiscal outcomes suffered significantly.

This paper reviews fiscal outcomes during the 2000s against the backdrop of high growth rates and institutional advances across the region. In three cases, Turkey, Poland and Russia, we examine in detail how fiscal outcomes may have been affected by the types of fiscal institutions that countries adopted during the period leading up to the crisis. We find that not all institutional reforms were effective, partly because some (such as fiscal rules) may have been too inflexible to be operationally relevant in a crisis situation. Yet, on average, institutional reforms did help countries to better manage their fiscal situation. Section 1 reviews the macroeconomic and fiscal outcomes in ECA countries during the years leading up to the crisis of 2008-09 and the policies adopted in response to the crisis. Section 2 discusses the institutional reforms that were being adopted during this time and Section 3 focuses on how institutional reform in three countries, Poland, Russia and Turkey, in the period leading up to the crisis and in the crisis affected fiscal outcomes.

## 2 Fiscal institutions and outcomes

This paper draws from an extensive literature in exploring the relationship between fiscal institutional designs and fiscal outcomes. It builds on the insight that the public budget is subject to a common-pool problem where individual agencies (interest groups) tend towards over-consuming the (common) resource: public funds (Weingast, 1981; Shepsle and Johnson, 1981). Thus more fractured public sectors would have a greater tendency to overspend, generate deficits, and grow debt, a view that has been confirmed by empirical investigations beginning in the early 1990s with the work by Von Hagen *et al.* (1992, 1994, 1996, 2006 and 2008) concerning EU fiscal systems. Velasco (1999) and Tornell and Lane (1999) have formalized this insight.

The approach to measuring the degree of fiscal fragmentation has centered on the powers of the ministry of finance in the three main stages of budgeting: preparation, approval and implementation. Fiscal centralization corresponds to situations where the finance minister has a strong role in setting and enforcing fiscal targets, resolving conflicts over spending, and has the

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\* The World Bank.

authority to block expenditures in order to ensure that actual expenditures do not exceed authorized levels. In addition, the legislature has limited powers to amend the budget or increase aggregate expenditure. The finding has been that rules giving the ministry of finance strategic dominance on budgetary arrangements and in enforcing budget discipline, and limiting the amending power of parliaments and the opportunities for modification during implementation are “strongly conducive to fiscal discipline, *i.e.* relatively small deficits and public debt” (Von Hagen, 1992, p. 53). That centralization of authority over allocation and during execution of budgets matters for fiscal outcomes has been confirmed for later periods for the EU and EU accessions countries by the same and other authors (see Mulas-Granados *et al.*, 2006). It has also been found relevant for Latin America by Alesina *et al.* (1999b) and Stein *et al.* (1999), and Filc *et al.* (2004). Dabla-Norris *et al.* (2010) find evidence that the relationship between the design of fiscal institutions and fiscal outcomes holds in low-income countries as well.

Political fragmentation has also been found to drive fiscal outcomes indirectly by precluding or facilitating agreements on core institutional designs and, directly, through the competition for budgetary resources. Fabrizio and Mody (2008) review the channels linking politics to fiscal outcomes. In politically fragmented environments, a “desirable” allocation of mandates may be infeasible because political actors may fail to come to an agreement on institutional consolidation. Von Hagen and Hallerberg (1999) contend that in such environments a “contract” as opposed to a “delegation” approach works better. The contract approach would seek agreements among relevant parties at the start of the budgeting process, with the bargaining amongst the parties providing the framework for developing a comprehensive view of the budget thus overcoming the common pool externality. In extreme case, however, the symbiosis between institutional and political fragmentation can lead to tightly-knotted arrangements that delay reforms and follow the dynamics described by Alesina and Drazen (1993).

Transparency in budgetary practices as an aide to delivering better fiscal outcomes has also received attention in the literature: transparency can help prevent players from hiding incomes, expenditures and especially negative fiscal outcomes. But implementing transparency can be difficult in practice. Alesina and Perotti (1999) in discussing the relevance of transparency pointed to possible measurement difficulties. International institutions have invested in developing transparency measurement criteria such as the IMF’s *Code of Good Practices on Fiscal Transparency*, which has been used to produce Reports on Observation of Standard and Codes (ROSC) for a large number of countries. Using information from these reports Hameed (2005) finds that transparency matters to delivering fiscal discipline, controlling corruption and achieving better credit ratings (see also Debrun and Kumar, 2007, on the disciplining role of transparency). Alesina (2010) is of the view that transparency in the budget and outcomes is the most important element in delivering good fiscal outcomes because it is more difficult for pressure groups to hide wasteful programs in an environment of greater transparency.

The traditional focus on (primary) deficits and debt-to-GDP ratios has been shifting to the pro-cyclical fiscal behavior of governments, something which seems ubiquitous in developed, transition and developing economies. Fragmentation and lack of transparency are found to also explain pro-cyclical fiscal behavior. Alesina *et al.* (2008) indicate that in developing countries pro-cyclical behavior is likely to be linked with a lack of transparency. Given that pro-cyclical behavior occurs even in European economies ranked high on transparency standards, other factors are likely to be at play. Complementary explanations therefore point to the inability to make credible inter-temporal commitments to the future allocation of resources. Balassone and Kumar (2007) review the challenges of cyclical behavior for fiscal institutional design.

In countries around the world, considerable attention has been given to improving fiscal institutional designs anchored on the emerging consensus that institutions matter for fiscal outcomes. Fiscal institutions of various types have been adopted to counter budgetary



fragmentation and non-transparency in fiscal policy. The underlying presumption is that certain budgetary procedures could reduce institutional fragmentation, increase transparency and improve fiscal outcomes; these procedures are often strengthened when they are supported by quantitative targets which facilitate adherence and monitoring. Within this strategic framework, the ongoing efforts to tame pro-cyclical behavior and *ad hoc* changes in budgets emphasize the introduction of Medium Term Expenditure Frameworks (MTEFs), or multi-year fiscal policy and planning embedded in consistent macroeconomic projections. MTEFs, along with other measures to bolster data release, enhance transparency, and by facilitating discussions on quantitative and monitorable outcomes, facilitate good policymaking. In practice, the worldwide experience, including that in transition economies, over the last two decades indicates that such investments in supporting fiscal systems take time to design and implement.

One type of fiscal institution, fiscal rules, have a long and successful history at sub-national levels in the US and in Switzerland. At the national level, they have become popular worldwide only recently. In 1990, five countries had fiscal rules at the national level; over 80 countries today have them. Fiscal rules can be adopted nationally or be part of external agreements like they are for the EU countries. Some countries (e.g., Poland) have both national and supranational rules. The design of fiscal rules varies but overall the focus of these rules is to constrain fiscal aggregates by introducing ceilings on fiscal balances, public debt to GDP, or overall expenditures, or by setting overall revenue targets. The literature finds that rules may enhance fiscal discipline. However, focusing on rules that are not binding in good times (when revenues are rising fast) may not impede pro-cyclical behavior and a deterioration in fiscal policy. Therefore, better designed fiscal rules would place greater emphasis on debt sustainability and smoothing expenditures over the economic cycle with an emphasis on structural deficits in an effort to address inter-temporal inconsistencies. Recently Chile adopted a fiscal rule, whose design takes these issues into account. The inherent risk in defining and using these rules, however, lies in increasing the complexity by requiring a good understanding of where the economy is in the cycle and identifying the “special circumstances” that may require deviating from them. Differentiating between cyclical downturns, short term shocks and longer term trends is not an easy matter, even in developed countries.

There is also some skepticism about the role of rules. This skepticism centers on the observation that rules work best when they are not binding. Schick (2009) notes that “Fiscal rules should have much of their bite when the economy is strong; if they do not, they may do much harm and little good when the economy is weak”. Thus, the test of rules and strong institutions more generally is the ability to manage the good times. Institutions that complement fiscal rules and bolster inter-temporal consistency of fiscal policy are Independent Fiscal Agencies (Eichengreen, Hausmann and Von Hagen, 1999). The concept of establishing fiscal agencies to independently assess, monitor and evaluate fiscal policy builds on the positive experience with Central Bank independence and the conduct of monetary policy. Potential mandates for such agencies include setting the yearly level of the deficit or surplus and ensuring debt sustainability; in the case of an abrupt economic change the agency would have the mandate to adjust the fiscal stance as needed. Fiscal agencies, with a variety of mandates, have been emerging with a focus on independent forecasts, analysis or normative judgments; these types of agencies can help meet institutional deficiencies specific to individual countries.

A working hypothesis today is that fiscal institutions can support good policy making and in particular, fiscal rules can serve to deliver improved fiscal outcomes in politically fragmented environments. The view has been that fiscal rules can help lock in gains by introducing (quantitative) hard budget constraints, complementing sound institutional designs for budget management and a policy of transparency that responds to the demands of various constituencies. A broader question is whether legislation establishing fiscal rules alone can substitute for

inadequate institutions in highly fragmented political and institutional environments, bypassing the painful efforts of broader institution building in which fiscal rules would be one ingredient.

### 2.1 *Fiscal outcomes in the 2000s in Europe and Central Asia*

During 2005-07, ECA countries averaged a growth rate of 6.7 per cent as compared with 5.2 per cent during 2000-04 and 3.8 per cent during 1995-2000.<sup>1</sup> While there was a great deal of variation among countries, (for example, Azerbaijan grew at 25 per cent in 2007 versus Turkey at 4.7 per cent), growth was higher than the average in half the countries during 2005-07. Figures 1a and 1b show average growth rates during this period for all of ECA but also different groups in ECA. Growth in incomes reflected both large increases in investment, consumption and increasing integration in world markets.

High GDP growth and increasing integration had substantial impacts on the fiscal position of ECA countries, the effect differing among countries depending on their initial conditions. For example, for the oil and gas exporters (OGE) fiscal developments are closely tied to world markets for oil and gas.<sup>2</sup> Fast growing world markets meant high export values and high corporate profits. Fiscal revenues rose substantially. At the same time, in these economies the management of fiscal revenues from the oil and gas sectors has been of significant concern. The EU accession countries are distinguished by the nature of the fiscal and other structural reforms they have undertaken. This group which also has the higher income countries of the ECA region experienced a higher increase in trade integration than the other groups in the region. The graph EU10+ includes Croatia and Turkey in the group.<sup>3</sup> The decline in trade during the crisis affected tax receipts in many of the smaller countries substantially in the crisis. The low and lower middle income countries (LLMIC)<sup>4</sup> also had substantial growth in output and trade during the pre-2008 period which had a positive impact on their fiscal outcomes, even though their fiscal institutions are less developed.

### 2.2 *Rising size of the public sector*

ECA countries' fiscal situations improved dramatically alongside growth during 2000-07 and the first half of 2008, in large part because of substantial fiscal revenue growth in their booming economies. During this period most countries also reformed tax policies and institutions. The reforms of tax policies aimed to reduce the tax burden on the private sector with the aim of supporting investment and growth but at the same time, reforms sought to broaden the tax base to maintain tax revenues. During this period, many countries also began reforms to enhance the efficiency of expenditures and to rationalize government spending. However, in the mid-2000s, some of the efforts appear to have weakened.

From the early 2000s to 2007, real fiscal revenue growth in ECA was high and rising. As a share of GDP revenues were 33.6 per cent during 1995-2000, and 32.5 per cent during 2000-04. As GDP accelerated, real fiscal revenue growth in ECA was high and rising and surpassed GDP growth in 2005-07 to be 35.2 per cent of GDP. As a ratio to GDP, revenues rose the most in the LLMIC group (outside of the oil related revenues accruing to the OGE), and the least in the

<sup>1</sup> All averages relative to GDP will be GDP weighted unless otherwise stated. Unweighted growth rates were 7.8 per cent overall, 15.2 per cent for the OGE, 6.7 for the EU10+ and 7 per cent for the LLMIC.

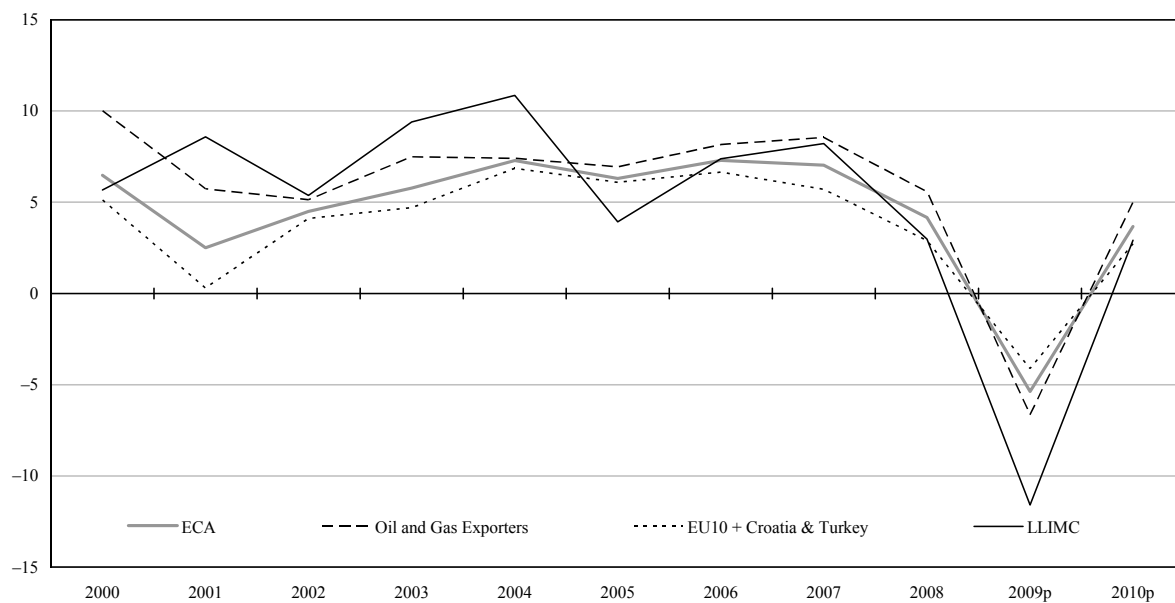
<sup>2</sup> The oil and gas exporters are Kazakhstan, Russia and Azerbaijan.

<sup>3</sup> The EU10+ group is composed of: Poland, Latvia, Lithuania, Hungary, the Czech Republic, Slovenia, Slovakia, Bulgaria, Estonia, Croatia and Turkey.

<sup>4</sup> The LLMIC are: Albania, Armenia, Georgia, Kosovo, Kyrgyz Republic, Moldova, Tajikistan, Ukraine.

Figure 1a

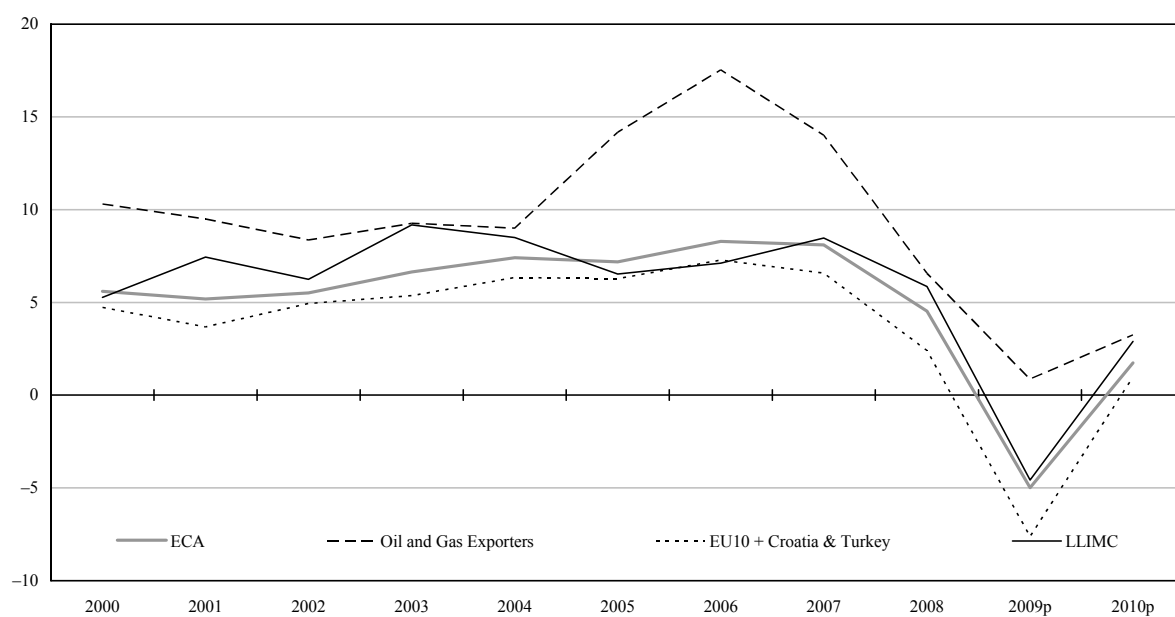
### Weighted Real GDP Growth Rates for ECA and Subgroups (percent)



Source: World Bank Regional Tables.

Figure 1b

### Non-weighted GDP Annual Growth Rates (percent)

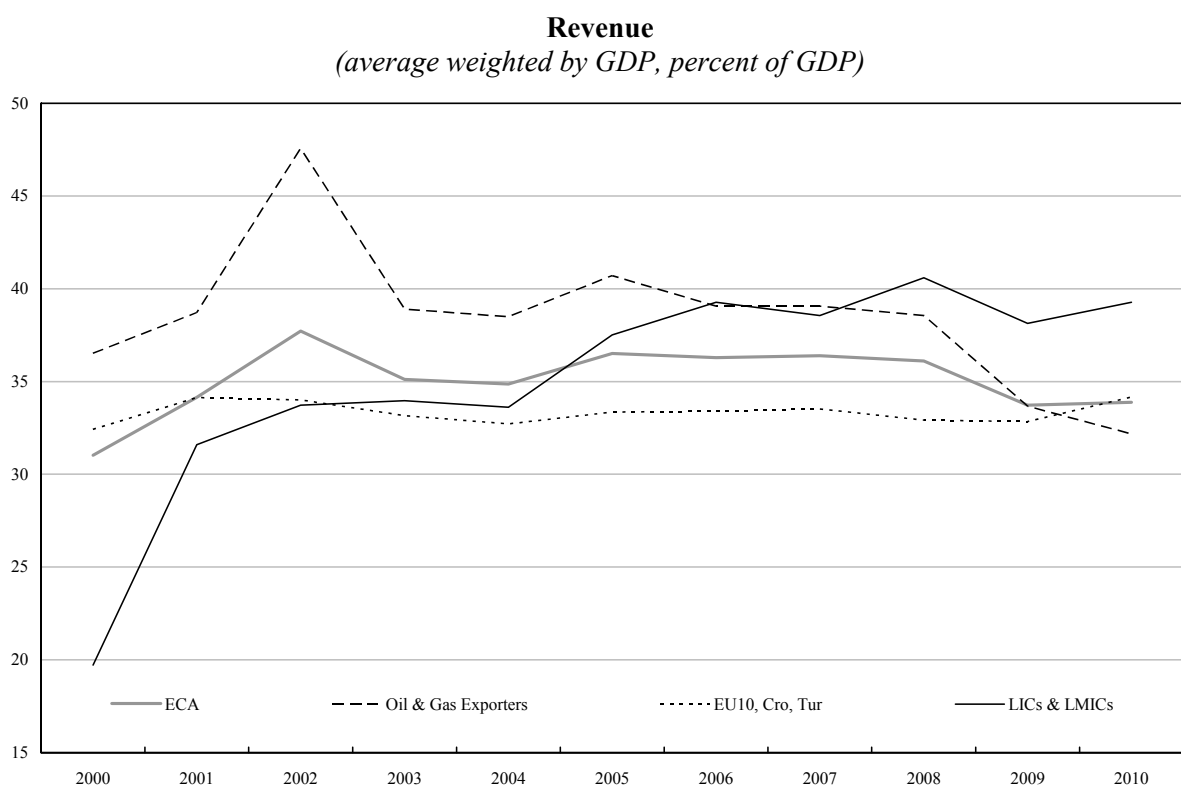


Source: World Bank Regional Tables.

Figure 2a



Figure 2b



EU+ countries, even though real growth was 7.5 per cent in 2007 for this group. When averages are weighted by GDP however, the OGE revenue to GDP ratio is fairly constant (implying that in the larger countries, growth was slower), though the LLMIC come out stronger. Among the EU10 countries, the revenue share to GDP was fairly constant when weighted, but rose for the unweighted average as small countries experienced a rising share. In countries where revenues followed patterns in imports, they would have exhibited more volatility relative to GDP. In 2007, 30 per cent of ECA countries had real fiscal revenue growth above 10 per cent:<sup>5</sup> Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakhstan, Kyrgyz Republic, and Montenegro. Just under half the countries had real revenue growth over 10 per cent in 2006 and 40 per cent in 2005. By 2007, fiscal revenues to GDP were 36.4 per cent, though the OGE were at 39 per cent in weighted terms (Figures 2a and 2b).

At the same time, average fiscal expenditures grew from just over 34.3 per cent of GDP in 2000 to an average of 36.4 per cent of GDP by 2007 though they fell in weighted terms until 2007.<sup>6</sup> There was a lot of variation among countries. In fact, despite much higher GDP growth in the 2000s relative to the period 1995-2000, expenditures grew faster for many countries, though in GDP weighted terms, fiscal expenditures relative to GDP declined until 2007 for the EU10+ and OGE groups, but not for the LLMIC group. During 2006-07, average expenditure growth was more than 10 per cent in real terms. Real expenditure growth was over 10 per cent in 12 ECA countries in 2007 and in 9 countries in 2006. The period 2004-07 is distinguished by an acceleration in expenditure growth (see Figures 3a and 3b).

### 2.3 *The impact of the crisis*

Until the crisis struck, deficits and debt showed tremendous improvements in the 2000s. During 2000-03, the GDP weighted fiscal balance was a deficit of 3 per cent of GDP on average. This reflected higher deficits in the EU10+ group of over 6 per cent of GDP per cent on average and in the LLMIC of 2 per cent. The OGE had surpluses during this time. Due to impressive revenue performance, and strong growth, the debt-to-GDP ratios of ECA countries improved dramatically during 2000-07, the ECA (weighted) average falling from 46 per cent of GDP to 23 per cent of GDP. The decline was the largest in the LLMIC countries where debt/GDP fell by around 16 percentage points of GDP from 47 to 31 per cent. The EU10+ group had smaller declines and was the most indebted in 2007.

When the global economic crisis struck ECA countries in 2008, governments had already programmed large increases in expenditures and had to adopt revised budgets in 2008 that cut expenditures during the year in expectation of shortfalls in revenue. However, none of the ECA countries had declines in nominal expenditure levels (and only 6 had declines in real terms). Though the crisis in 2008 had an immediate impact in many countries, 24 countries still had nominal expenditure growth of over 10 per cent in 2008 (though only 10 saw growth in real terms at this rate) and 15 had growth over 20 per cent (though only 1 had real growth at this rate). The adjustment is more visible when looking at expenditure to GDP ratios which fell (in terms of percentage points of GDP) in 11 countries in 2008 and 6 in 2009.

### 2.4 *The crisis*

As a result of the changes in expenditures and revenues, in 2009, the average deficit for ECA

<sup>5</sup> The GDP deflator is used in calculating real values.

<sup>6</sup> Note that all growth rates are given in unweighted terms.

Figure 3a

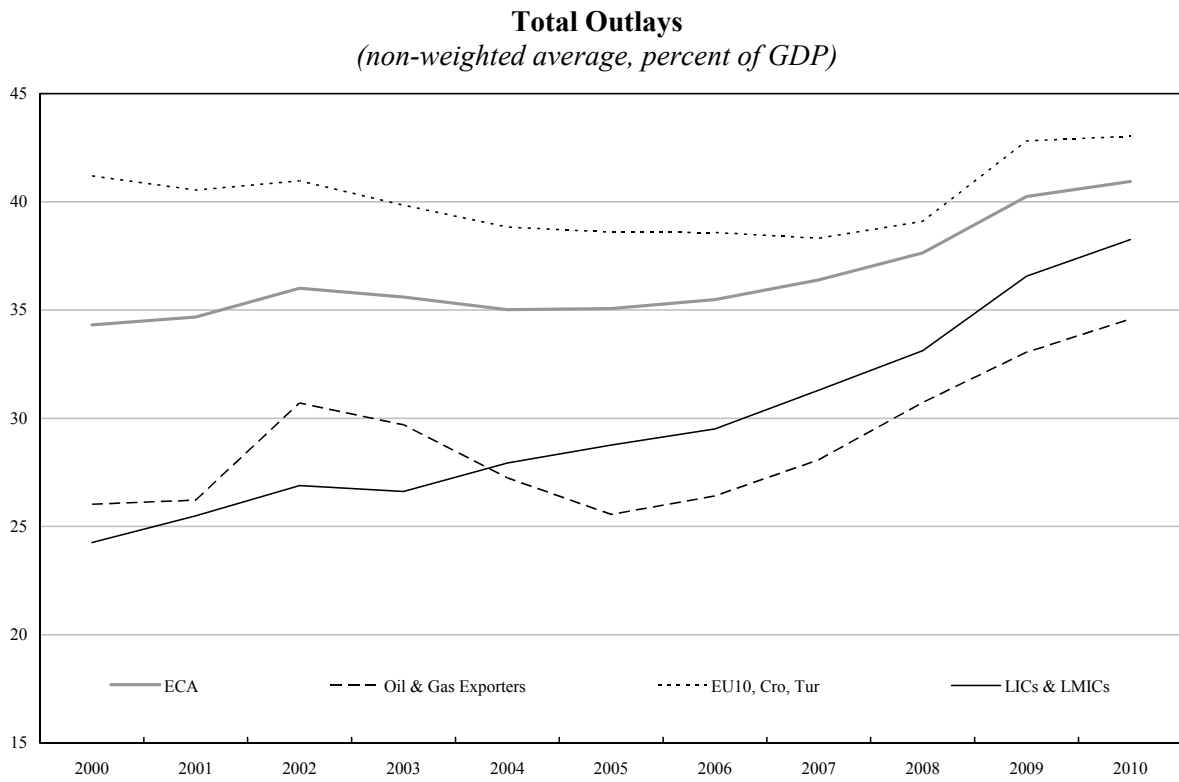
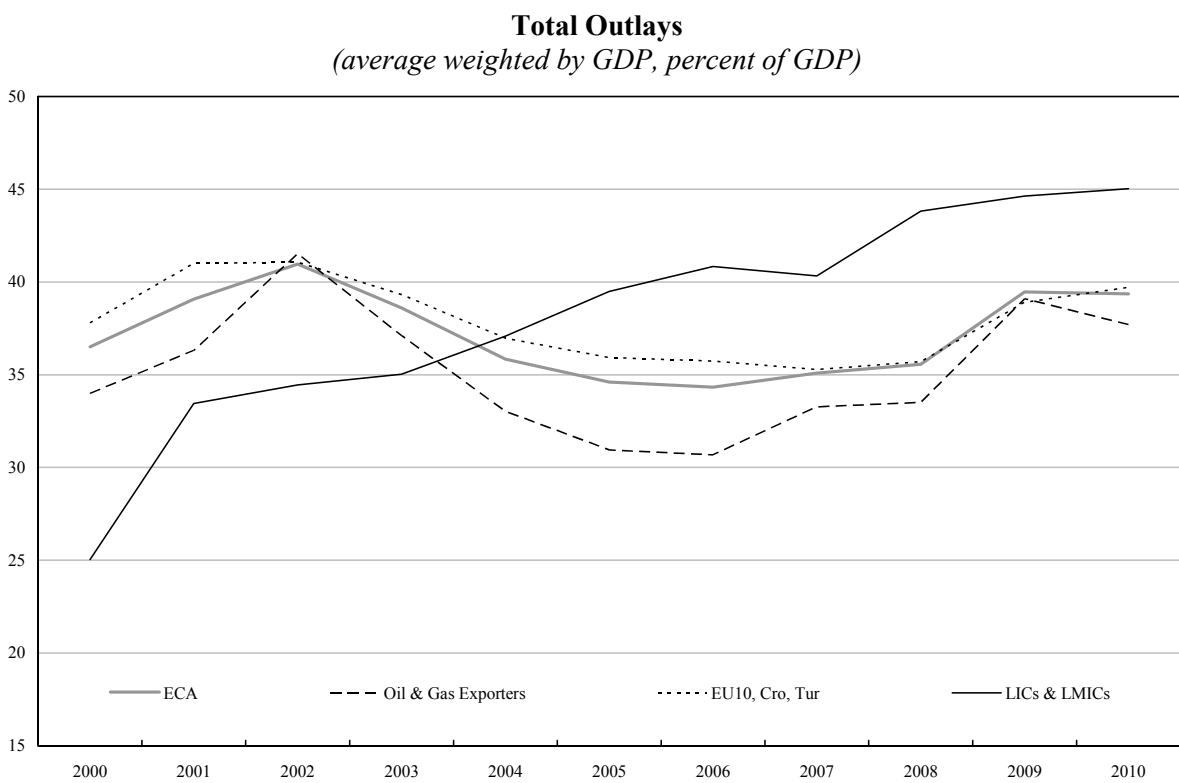


Figure 3b



rose by over 4 percentage points of GDP relative to 2008 and 6 percentage points of GDP relative to 2007. Seven countries had a deterioration of 5 percentage points or more. Russia and Kazakhstan stand out with very large deteriorations reflecting their large stimulus packages. But the largest deficits were in Latvia and Lithuania (9 per cent) with Georgia and Romania following (8 per cent) in 2009. Sixty per cent of the countries with the largest deficits in 2009 (near 7 per cent or above) had the highest share of taxes coming from VAT/taxes on goods and services.

In order to manage their fiscal positions, ECA countries undertook a number of policies. There was a wide variation in responses, with some countries raising taxes, others lowering them, some running arrears and others reducing expenditures of various kinds. Some of the policies adopted are short term in nature and expected to be reversed (for example, lengthening the duration of unemployment compensation, or announcing temporary VAT cuts); others will need to be considered more carefully in the longer run (for example, the desired level and type of capital expenditures). The fiscal policies used are summarized in Table 1.

Table 1 indicates that most governments had policies to contain the wage bill, and most had some sort of tax policy change during the crisis. Their efforts indicate that public sector compensation is (and will probably remain) an issue for budget management. Many countries used tax cuts to stimulate spending, but some had to increase taxes to offset the dramatic revenue declines or tax rate declines of previous years which took effect during the crisis years. Several supported their financial sectors and many governments took measures to help the unemployed and vulnerable.

In sum, an analysis of the fiscal outcomes of the 2000s reveals that governments had substantially improved their fiscal positions in terms of reducing deficits and debt until the crisis struck in 2008. It also highlights how fiscal adjustment if measured in terms of deficits and debt, may be relatively painless under high growth rates. The decline of 2008, however, illustrates the risk that volatile environments pose for fiscal outcomes. While governments were able to go on a spending spree in the mid-2000s, greater restraint would have meant lower deficits in the crisis. ECA countries adopted both expenditure and tax policies to (a) contain deficits or (b) boost aggregate demand or alternatively, (c) protect certain segments of the population. Many of the policies they adopted were short-term in nature (for example a freeze on wages) and would have been less necessary with more restraint.

Any review of developments in the ECA region in the pre-crisis years and extensive efforts to contain budgets in the crisis years would be incomplete without some assessment of the institutional changes that were taking place in these countries as fiscal outcomes improved in the 2000s. The next section describes some of these important changes in ECA's fiscal institutions and the following section examines the impact of institutional changes in three countries.

### 3 Fiscal institutional reforms: A bird's eye view<sup>7</sup>

The design, reform or creation of fiscal institutions has been a major challenge for transition economies where defining the boundaries of the state has been and remains a continuing challenge. The point of departure in the reform process across countries differed substantially depending on the length of time each country spent under socialism and the type of socialism it practiced. All countries faced severe political and institutional fragmentation, which led to the emergence of soft-budget constraints with noted fiscal consequences that delayed the transition process (Kornai *et al.*, 2003; World Bank, 2002). The efforts to address these challenges included the corporatization of productive and financial enterprises and their privatization as well as setting the institutional frameworks for social security, and introducing fiscal systems for local and regional governments.

<sup>7</sup> This section is drawn from Eckhardt and Islam (2010).

Table 1

**Fiscal Policies in the Crisis Years 2008-09**

Wage Bill (Wage Growth/Employment) <sup>(a)</sup>	Armenia, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Ukraine
Pensions: Indexation change or other adjustment <sup>(b)</sup>	Albania, Belarus, Bosnia, Croatia, Estonia, Georgia, Hungary, Latvia, Macedonia, Romania, Russia, Serbia, Tajikistan,
Tax Cuts	Armenia, Belarus, Czech Republic, Estonia, Kazakhstan, Latvia, Lithuania, Macedonia, Poland, Russia, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine
Tax Increases	Belarus, Croatia, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Serbia, Slovenia, Ukraine
Financial Sector Measures <sup>(c)</sup>	Albania, Azerbaijan, Belarus, Bulgaria, Croatia, Czech Republic, Hungary, Kazakhstan, Latvia, Montenegro, Poland, Russia, Slovakia, Slovenia, Ukraine
Cuts in Capital Expenditures <sup>(d)</sup>	Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Hungary, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Romania, Serbia, Slovenia, Turkey, Ukraine
Increases in Capital <sup>(e)</sup> Expenditures	Czech Republic, Georgia, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Macedonia, Moldova, Poland, Russia, Slovak Republic, Tajikistan
Arrears Owed to or by Government <sup>(f)</sup>	Albania, Bosnia, Bulgaria, Croatia, Kosovo, Latvia, Moldova, Montenegro, Romania, Russia, Tajikistan
Employment/Unemployment Related Policies	Armenia, Bosnia, Bulgaria, Croatia, Czech Republic, Kazakhstan, Latvia, Montenegro, Romania, Russia, Slovak Republic, Slovenia, Tajikistan, Turkey
Change in Subsidies to Enterprises/Other	Armenia, Azerbaijan, Croatia, Estonia, Kazakhstan, Macedonia, Moldova, Montenegro, Romania, Russia, Serbia, Slovak Republic, Slovenia, Turkey, Ukraine
Increase in Social Transfers <sup>(g)</sup>	Albania, Armenia, Azerbaijan, Belarus, Croatia, Georgia, Hungary (lowered), Kazakhstan, Kyrgyz Republic, Latvia, Lithuania (lowered), Macedonia, Moldova, Montenegro, Romania, Serbia, Slovak Republic, Slovenia, Tajikistan, Ukraine
Public Works	Armenia, Bulgaria, Hungary, Kazakhstan, Macedonia, Moldova, Russia, Slovenia, Tajikistan, Turkey

<sup>(a)</sup> Kosovo, Kyrgyz Republic and Kazakhstan had wage increases in 2009. The Czech Republic had a wage increase but employment reduction. The others had declines in wages and/or employment. Several countries had declines in general current expenditures as well.

<sup>(b)</sup> Russia, Tajikistan and Turkey had increases in 2009.

<sup>(c)</sup> Does not cover central bank support of various kinds to the financial sector.

<sup>(d)</sup> These refer to cuts in 2009. Though countries may have begun adjusting at end-2008, the overall numbers may or may not have shown adjustments.

<sup>(e)</sup> These refer to increases in 2009. Though countries may have begun adjusting at end-2008, the overall numbers may or may not have shown adjustments.

<sup>(f)</sup> For Montenegro and Russia they were arrears owed to government.

<sup>(g)</sup> Some countries adopted policies to rationalize expenditures in the social sectors, e.g., eliminating free-of-charge textbooks. These are not addressed here but are explained in the full country matrices.



The fiscal institutional building agenda focused on fundamentals, such as taxation, accounting, treasury and the establishment of budgetary procedures. These changes have happened in a fluid and fragmented political situation. Not surprisingly, design and implementation of these agendas has taken time and proceeded in spurts often linked to external events. The efforts by transition economies to close institutional gaps that existed with respect to market economies provide valuable experimental information on the process of change and the role of fiscal institutions in reducing fragmentation and increasing transparency, the importance of political fragmentation, and the contribution of economic events.

As discussed, the 2000s, particularly the latter half, saw high growth rates and improving fiscal positions. During this time ECA countries were very outward focused integrating with global markets. Higher integration meant also that changes in the external environment became very important for fiscal policies and outcomes. Many countries acceded to the EU adopting EU reforms, while other countries saw change to various degrees. The crisis of the late 2000s, brought certain weaknesses in fiscal management to the forefront of policy discussion during this period of fiscal adjustment. The 2008/09 crisis tested the readiness of some of the institutions ECA countries had put in place and highlighted areas in which countries need to move forward.

Most countries in the ECA region have made progress in reforming their fiscal institutions, but the pace of institutional change has been uneven. The World Bank's Country Policy and Institutional Assessments (CPIA) attempt to measure the quality of policy and institutions in member countries in a number of areas. These assessments are based on both quantitative, monitorable indicators of policy and institutional reform, as well as judgments by country teams.<sup>8</sup> One of the indicators considered relates to the quality of public administration. Its evolution suggests that the majority of countries have made some progress over the past decade, and while some countries seem to have stagnated, none of the countries seems to have experienced a major deterioration in institutional quality. However, the quality of fiscal systems continues to differ across the region with differences in income levels. Figure 4 below shows the evolution of the CPIA indicator for ECA countries separated into three groups according to GDP per capita. The top third in terms of income per capita have much higher scores as might be expected, but countries at the lower and middle income categories have also been improving. Variance in institutional quality for a given level of income is greater among lower and middle income countries, while it converges among the high income countries.

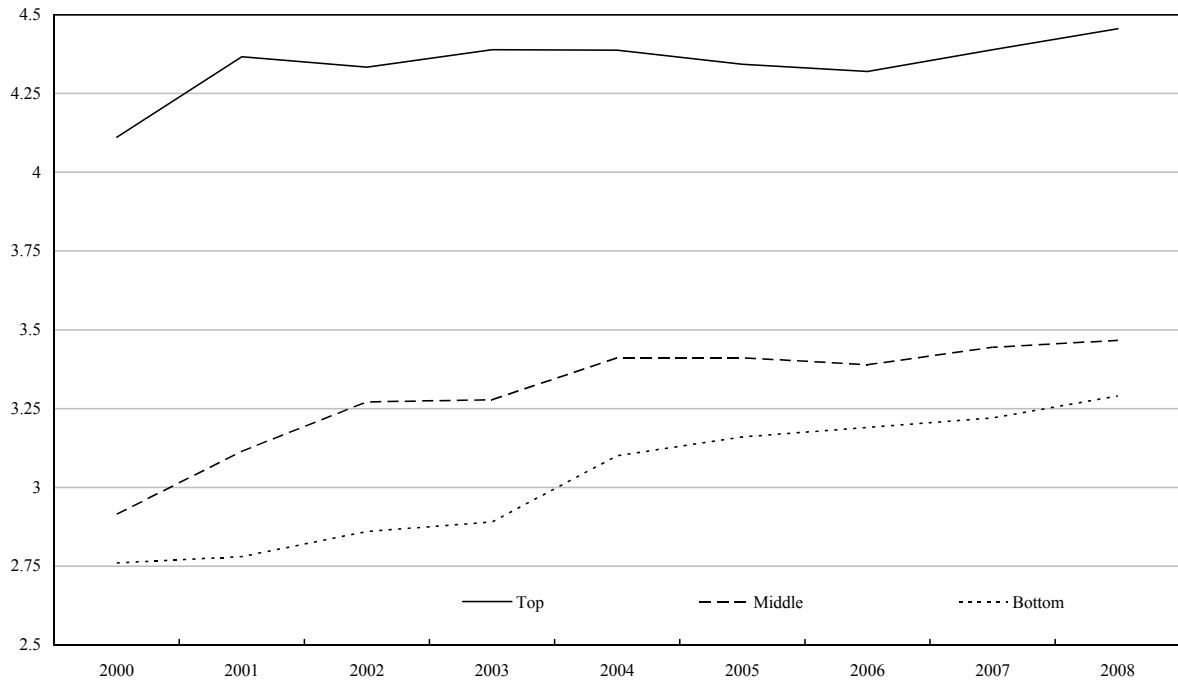
The first part of the decade saw the largest change in institutional quality for all groups as Figure 5 shows. The middle group had the greatest improvements, followed by the countries in the bottom third income group. In the second half of the decade, the rate of change in institutional improvement was stronger in the lowest income group among the ECA countries. Despite these changes in the second and third tier income groups, the top countries in terms of per capita income have much better quality of institutions.

Overall in ECA, the fiscal reform agenda has evolved over the last decade. The first decade of transition (1990-2000) was dominated by institutional changes designed to overcome the legacy of central planning systems. During this time, reforms included the establishment of treasuries to improve the execution of the budget and cash management, the gradual integration of off-budgetary funds, the clarification of roles and responsibilities of different institutions in the budget process, establishment of democratic checks and balances, such as legislative budget approval and establishment of external audit institutions. There were major fiscal consolidation efforts in many countries of the region. Many countries put in place fundamental financial management regulations through the adoption of organic budget and treasury laws.

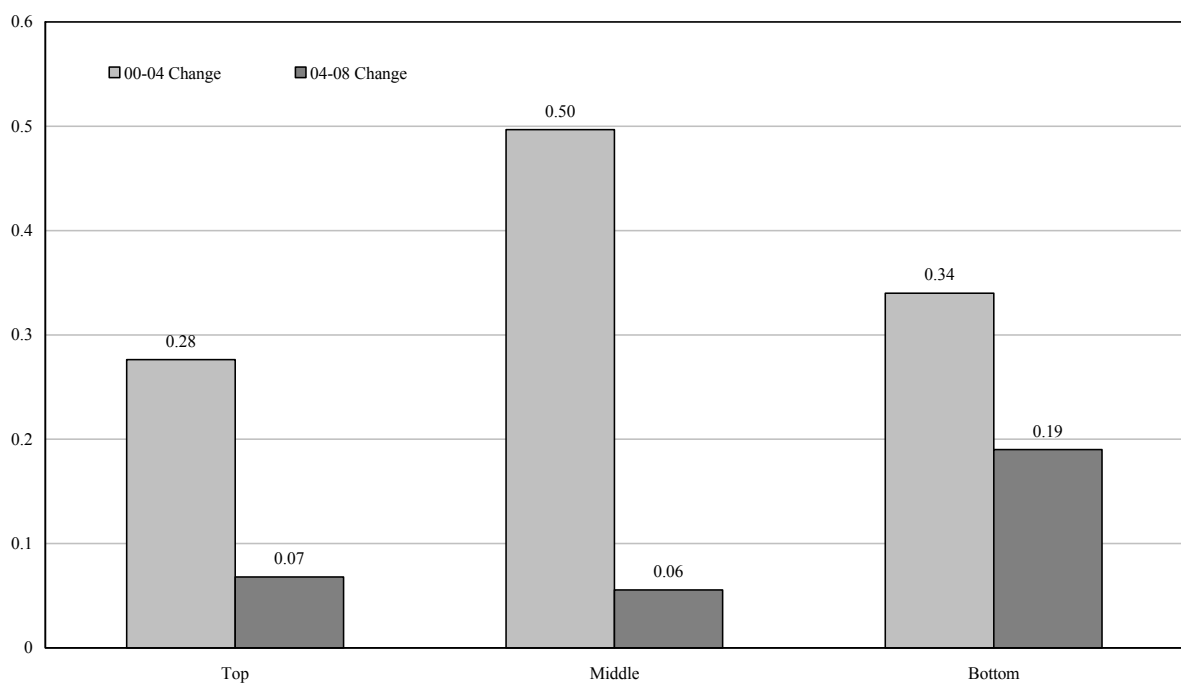
<sup>8</sup> Countries are rated on a score of 1 to 6.

**Figure 4**

**Average Score – Public Sector Management and Institutions, 2000-08**  
*(top, middle and bottom countries in terms of per capita income)*

**Figure 5**

**Change in Average Score (2000-04 and 2004-08) – Public Sector Management and Institutions**  
*(top, middle and bottom countries in terms of per capita income)*



With the most basic fiscal management foundations in place, the reform agenda during the second decade (2000-10) has moved to tackle more advanced challenges, such as linking expenditure prioritization more closely to policy objectives, introduction of a medium term perspective in fiscal policy, mostly through the adoption of Medium Term Expenditure Frameworks (MTEF) and a move away from detailed input controls to more performance and results orientation in expenditure management. Most countries in the region have some form of MTEF with differing degrees of integration with the budget process. Armenia's MTEF for example, is an integral part of the budgetary process. In Croatia, the MTEFs are formally adopted by Parliament. In addition, countries have begun adopting various kinds of fiscal rules to contain budgets and public debt (the EU accession countries have supranational rules under the convergence programs which limit debt and deficit ratios to GDP). Tax administration reforms have also advanced and many countries have begun to adopt practices compliant with the principles of self-assessment, better risk management, simplicity, greater transparency, client segmentation and specialization aimed at reducing compliance burden and administrative costs.

In addition, along with the democratization of political systems across the region, parliaments have taken on strong oversight roles in the budget process in most countries. Legislative scrutiny and enactment of annual budget laws is an essential element supporting government accountability. This type of scrutiny is intended to provide both an institutional check on executive power and voice to public demands. As the role of legislatures has grown budget decisions have become more transparent across ECA countries. This was particularly important during the recent crisis when many governments had to undertake budget amendments and difficult budgetary decisions.

The specific role of Parliaments and the authority they enjoy vary across countries, and depend to a great extent on the constitutional traditions of a country. Some legislatures have virtually unlimited powers to amend and change executive budget proposals, including changes that affect the Government's overall fiscal stance. In other countries, parliamentary powers over the budget are constrained to only effecting expenditure reallocations in the initial deficit target set by the executive. For example, in Croatia the 2003 Organic Budget Law and a subsequent version passed in 2008 requires that any amendment proposal needs to identify an offsetting measure to remain deficit neutral. Several different types of arrangements may be consistent with fiscal discipline, depending on the existence of other constraints faced by the executive and legislative arms of government. However, unlimited budgetary amendment powers require that constraints on fiscal expansion do exist in the budget review process to restrain elected representatives from overspending. Parliaments in ECA enjoy amendment powers of various types. Among those parliaments with unlimited amendment powers are those of Albania and Romania. Bulgaria, Poland, Russia, and Turkey are among those with limited amendment powers while the parliaments of Georgia and Azerbaijan do not enjoy formal amendment powers.

While there are common themes, such as policy based budgeting, performance orientation and medium term fiscal planning, fiscal reform challenges and priorities have varied across the region depending on the structure of the economy and other country characteristics. For example, the key fiscal policy and institutional challenge for oil and commodity exporters, like Russia, Kazakhstan and Azerbaijan was related to the prudent management of large revenue windfalls that have accrued over the past decade. For the new member states of the EU, reforms were driven by requirements of the accession process, including adoption of the SGP fiscal rules and fiduciary systems capable of managing and absorbing increasing transfers from the EU under the common agricultural policy and structural funds. In contrast, in some of the lower income countries the focus has remained on building the foundations for sustainable fiscal management with a focus on both reforms of revenue administrations to broaden tax bases and stabilize revenue generation and

systems for prudent expenditure control. Below, we look at two institutional reforms aimed at supporting fiscal discipline, in more detail.

### 3.1 *Fiscal rules*

As mentioned in Part I, The basic rationale for fiscal rules is to create a mutually binding and enforceable set of rules and procedures to encourage fiscally responsible behavior across time and/or different budgetary entities. Preestablished fiscal rules are particularly useful in settings characterized by multiple constituencies with the ability to initiate spending and revenue policies. If properly designed, a rules based approach can help secure control over consolidated fiscal balances while allowing a prudent degree of flexibility to entity governments. Numerical fiscal rules can apply to all fiscal aggregates: expenditure, the deficit, the debt stock, and revenue (although there are few practical examples).

The proliferation of fiscal rules across the ECA region is a relatively new trend. About half of the countries in the region have adopted fiscal rules, mostly during the past ten years. The types of fiscal rules they have adopted vary greatly among ECA countries. The new EU member states all comply with the EU stability and growth pact, but only a few have embedded the supranational rules in their national fiscal-institutional framework. In other countries fiscal rules have been included in organic budget laws or specific debt management and fiscal responsibility laws while others have promulgated fiscal targets either as part of their Medium Term Expenditure Frameworks or as general political commitments. Deficit and debt rules are by far the most popular type of rules among ECA countries. All EU member states are committed to the deficit and debt rule of the Stability and Growth Pact. In addition, Hungary, adopted a deficit rule requiring the general government primary budget balance be in surplus. Armenia's debt management law passed in 2008 establishes an overall constraint on public debt at 60 per cent of GDP and an additional limitation on the annual budget balance when debt is above 50 per cent of GDP.

As countries are faced with pressures emanating from the recent crisis, they have often exceeded constraints established by their fiscal rules. In the recent crisis, fiscal rules, in particular those constraining deficits, have been criticized for reinforcing pro-cyclical fiscal policy. Many countries have chosen to pursue an expansionary fiscal policy stance in reaction to the economic downturn, sometimes at the cost of exceeding preestablished deficit limits.

### 3.2 *Medium-term expenditure frameworks*

Medium-Term Expenditure Frameworks (MTEFs) are tools which aim to introduce a more strategic approach to budget formulation and help focus on fiscal priorities with a medium- to long-term perspective. MTEFs typically comprise top down estimates of the expected aggregate resource envelope, bottom up forward estimates of expenditures required to continue existing policy commitments and a framework to reconcile the two. Fully elaborated MTEFs translate the government's macroeconomic and fiscal strategy into budgetary policy. MTEFs can help safeguard fiscal sustainability by projecting the fiscal impact of current budget decisions, including the recurrent cost implications of capital expenditures and the available resource envelope over the medium term and by enhancing transparency. For MTEFs to be effective tools for expenditure prioritization and budgetary decision-making they need to be procedurally and institutionally integrated with the annual budget formulation process. In practice, countries rarely adopt fully articulated MTEFs, but selectively and/or sequentially apply key elements.

Almost all ECA countries (26 of the 28 examined) are now experimenting with some form of medium-term budgeting. Most of the medium-term frameworks cover a three or four-year period.

But the depth of medium-term planning and its impact on budgetary decisions vary across countries. Some countries prepare only forward estimates of fiscal aggregates (revenue, and broad expenditure categories) while others have developed full-fledged MTEFs with detailed bottom up expenditure estimates for existing programs as well as forward looking estimates.. The institutional coverage varies but many countries continue to cover only central government operations, though sub-national governments are included in the MTEFs of only a few countries, such as Armenia. In a majority of countries the institutional and procedural integration of MTEFs with the annual budget process is incomplete, undermining their real impact on expenditure prioritization. Only in some countries, like Croatia, Slovenia and the Slovak Republic are MTEFs formally adopted by Parliament; others adopt MTEFs as executive documents. A number of countries, including Armenia, Moldova and Russia have suspended the preparation of MTEFs in view of the recent volatility in the macro-economic environment. Economic volatility has thrown into uncertainty growth and revenue prospects, the costs associated with financing the deficit on world markets as well as expenditure needs arising from automatic stabilization.

#### **4 Three countries: How fiscal institutions performed Russia, Turkey and Poland**

In this section, we (a) examine the evolution of fiscal institutions during the 1990s and 2000s in Russia, Poland and Turkey in some detail; (b) discuss how these institutions and the degree of political fragmentation may have affected fiscal outcomes in the last decade; and (c) discuss how the latter in turn has affected institutional development.

The general developments in fiscal outcomes in ECA countries are reflected in the public sector outturns of Poland, Russia and Turkey during 2000-10. Turkey's fiscal adjustment, as shown by its dramatic reduction in the deficit was particularly remarkable in the aftermath of the crisis in 2001 to 2006 (Figure 6). Poland's deficit also falls continuously during 2003-07 and Russia's surpluses of the mid-2000s are impressive. Turkey's performance is the most impressive in containing the share of government in GDP: in Turkey, outlays to GDP fell continuously from 30.8 to 23.7 in 2006 (rising slightly in 2007), This was also true of Russia (outlays fell from 38.3 per cent to 31.6 per cent in 2006 but rose 2.6 percentage points of GDP in 2007 as the government boosted spending just before the crisis (Figure 7). Expenditures to GDP fell less in Poland (44.7 to 42.2 per cent in 2007) and the changes fluctuated in the period with some years seeing expenditures grow faster than GDP. The impact of the growth downturns in 2008 meant large deteriorations in the deficit for all countries as fiscal revenues fell (Figure 8). Also, all three countries protected expenditures during the growth collapse, Russia leading with a large stimulus package. In Turkey and Poland, debt to GDP rose while Russia used its oil reserves.

The three countries had very different institutional conditions at the beginning of the 90s many of which were maintained till the early 2000s. Poland and Russia, the "transition economies" changed their institutions to more market-oriented ones but with different points of departure. In the early 1990s, Poland's institutional framework was closer to market principles because market supporting structures had been in place before WWII and the transition process began in Poland earlier than in Russia. Russia in contrast, experienced a more centralized form of socialism and for a longer period, so that when the transition began the gap with market supporting institutions was larger than that in Poland. Overall Russia's challenge compares with the challenge of other CIS countries that had a similar point of departure. Turkey was not a transition economy in the traditional sense but rather made a transition from a long period of forced industrialization around an import substitution strategy which had run its course by 1980.

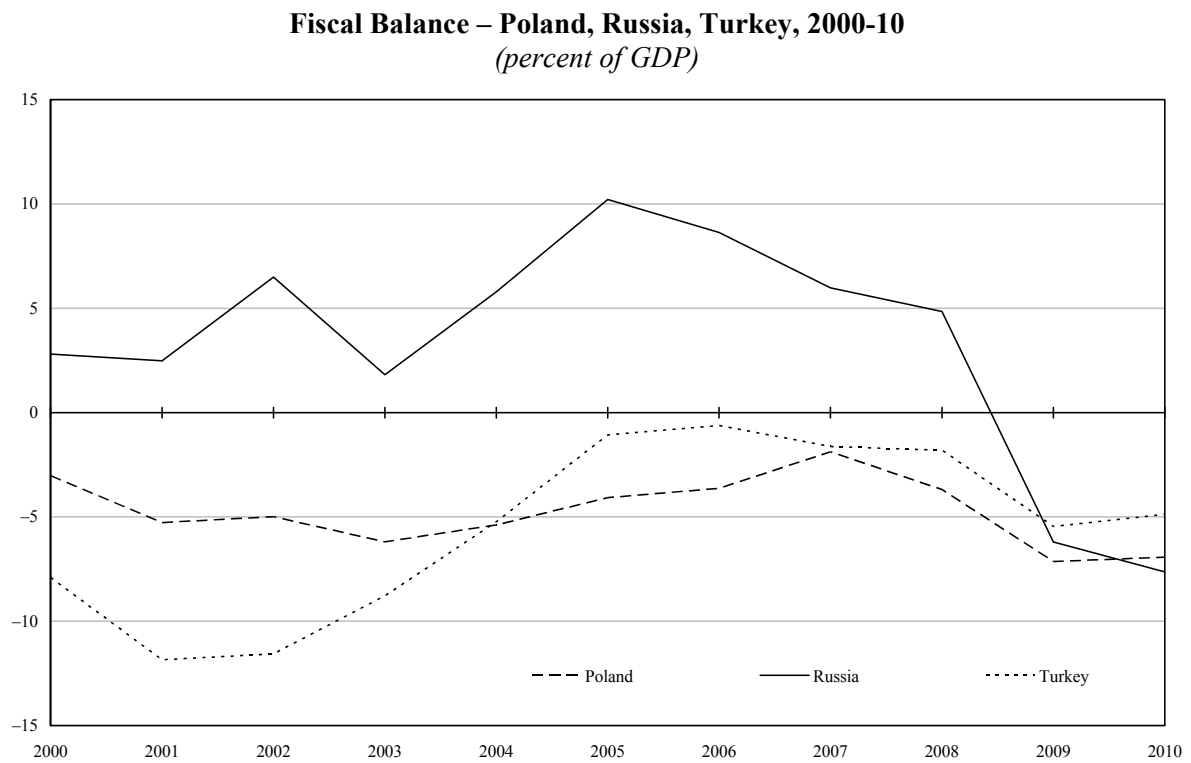
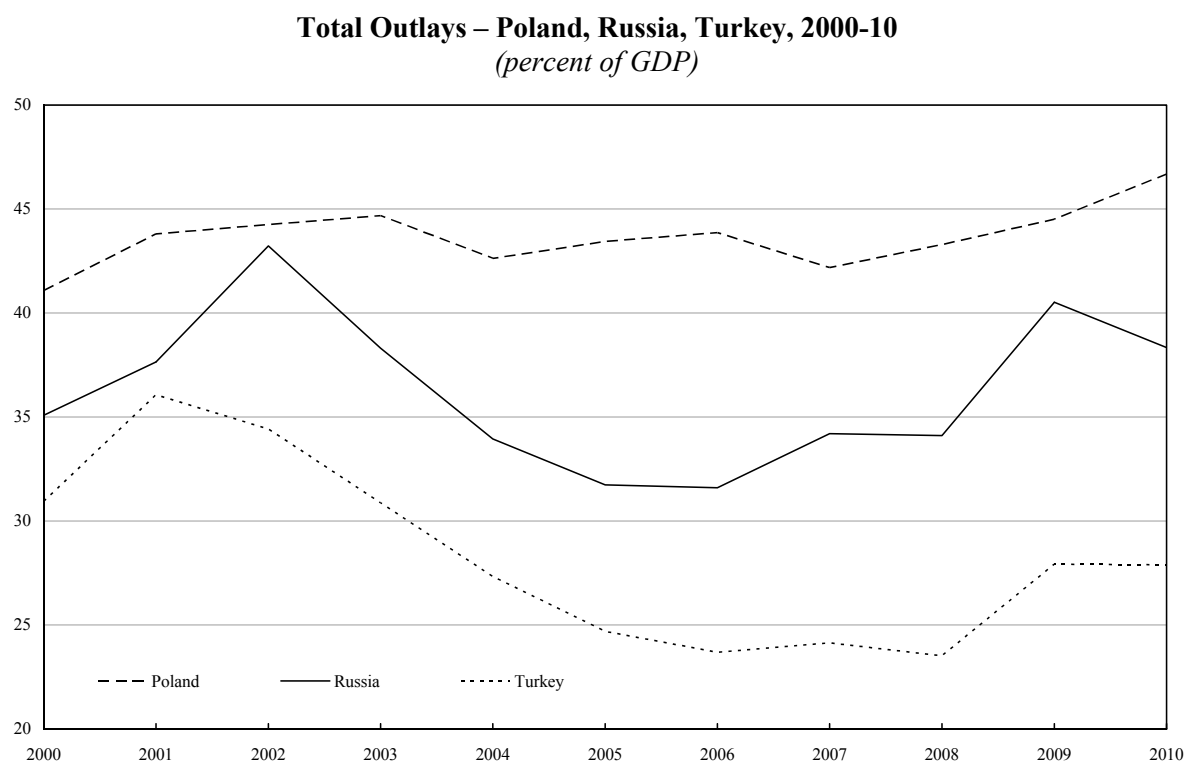
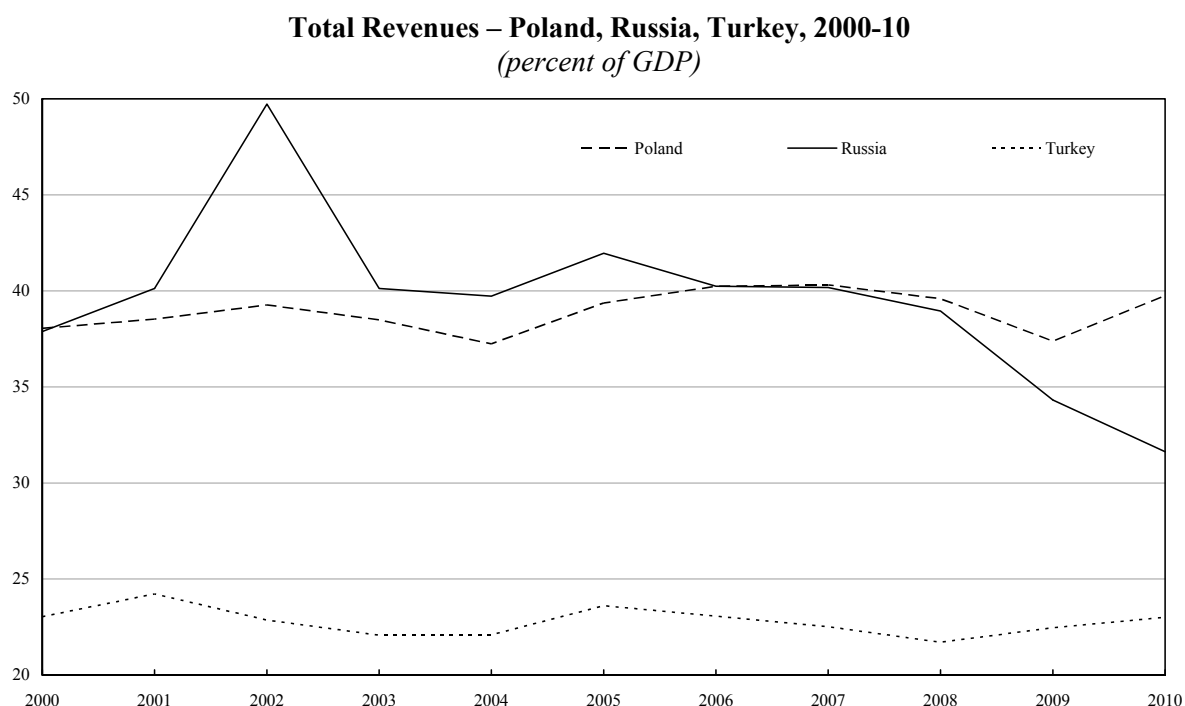
**Figure 6****Figure 7**

Figure 8



#### 4.1 Poland

The Magdalenka Agreement of early 1989 in Poland (alternatively referred to as the Roundtable Negotiations), concluded negotiations between the incumbent communists and the opposition, thus setting the basis for new, democratic institutions. Building on strong popular support, the Government of Prime Minister Mazowiecki undertook wholesale reform combining macroeconomic stabilization with comprehensive institutional reform and the government put fiscal reform at the center of its agenda. Through a combination of expenditure cuts and revenue increases, it narrowed the fiscal gap; the headline deficit decreased from 8.5 per cent of GDP in 1991 to 4.3 per cent of GDP in 1998 and 2.3 per cent of GDP in 1999. Other reforms, such as privatization and regulation to harden budget constraints focused on clarifying the boundaries of the state.

After a severe economic contraction in 1991, rapid economic growth and macroeconomic stabilization made Poland one of the leaders of the early transition period. In 1991, parliament approved the first comprehensive public finance law (Budget Law) that adjusted fiscal institutions to the new market economy regime. Later, the 1997 Constitution mandated restrictions on the level of the national debt, banned financing of the deficit by the Central Bank, empowered parliament to introduce changes to the draft of the State Budget and mandated parliament to pass a new comprehensive legal act on public finance. The constitutional rules on public debt stipulated maintaining (i) the outstanding central government public debt below 60 per cent of GDP and the (ii) the ratio of debt service to revenues for local governments below 15 per cent. The Public Finance Act that became effective January 1, 1999 mandated specific actions in the case that public debt moved close to 60 per cent of GDP. In addition, it laid out the framework governing the coverage of the budget, the roles of the budgetary units (departments and agencies), the procedures at the central and the local level of government and the submission of the budget to the parliament,

among related aspects. The fiscal rules gave the legislature powers to revise and alter revenue estimates and expenditure programs as long as it maintained the government-proposed nominal deficit levels. The President maintained the power to veto the budget proposed by the legislature. The legislation confirmed an independent audit agency, known as the Supreme Chamber. On availability of information, the Constitution and the Public Finance Act defined with precision the required scope and dates of publishing core fiscal information.

Political and institutional fragmentation still remained issues and their effects on the budget were aggravated by the lack of a single treasury account where budget units would maintain sub-accounts within a consolidated budget.<sup>9</sup> In addition, EU programs and projects were not included in budgetary estimates of expenditures or financing and thus were not part of the appropriation process of the legislature, although counterpart allocations, met from local sources, were included in the budget (albeit separately appropriated.) Upon Poland joining the EU in 2004, additional fiscal rules became mandatory and greater fiscal transparency was required. The 3 per cent of GDP ceiling on the fiscal deficit under the Growth and Stability Pact complemented Poland's rules on public debt. Amendments to the Act on Public Finances in 2001 and 2003 to comply with the *acquis communautaire* meant an additional strengthening of the 1998 fiscal reform efforts. Yet, all these reforms did not succeed in reducing fragmentation. A review by Von Hagen (2006) stressed that the authority of the Ministry of Finance within the cabinet and in relationship to Parliament faced constraints. Namely, the full cabinet had the power to override the Ministry of Finance and Parliament to make substantial modifications to the budget. Von Hagen pointed to how the fragmented political system at the time was an additional source of incoherence that affected the design of fiscal institutions. After reaching a peak of 6.7 per cent growth of GDP in 1997, in the aftermath of the Russian crisis economic growth in Poland slowed in the early 2000s. At the same time, the public sector deficit jumped from 3.4 per cent of GDP in 2000 to 5.9 per cent of GDP in 2004, driven by increases in transfers and subsidies, with the public debt to GDP rising from 37.6 in 2001 to around 47.1 per cent in 2005. Despite Poland's significant reforms, fiscal consolidation failed in the face of fragmented politics. Public expenditures remained high and social transfers (whose share of GDP continued to increase) much higher than other countries in the region with similar incomes per capita.

But, the booming external environment supported Poland's economic and fiscal recovery around the mid-2000s. However, the economic situation did not galvanize the authorities into action on expenditure rationalization. As growth eased the debt burden, fiscal rules and constraints were not binding: the debt/GDP ratio came down to 44.8 per cent by 2007. Fiscal improvements allowing consolidation of EU funds into the budget and the incorporation of extra-budgetary funds were implemented. Most importantly, in late 2007, a new government with parliamentary majority came to power and moved forward reforms that began to address points of fiscal weakness – pensions, taxes and social security contributions. These reform initiatives were launched before the crisis and were grounded partly (*i.e.*, reduction in social security contribution) in the buoyant public revenues at the time. Poland's fiscal improvements were substantially affected by the general economic reforms. Fiscal institutions did not contain expenditure growth.

When the global crisis struck in 2008, Poland undertook some fiscal expansion. Poland's economy suffered less than many others in the region, with the more moderate dependence on the external sector softening the impact of the external crisis. The government borrowed externally from international capital markets and official donors and undertook further expenditure rationalization, while providing support to the economy. The IMF estimates that the country provided significant fiscal stimulus during the crisis, with a discretionary fiscal relaxation

<sup>9</sup> WB OER 2003. Note, however, that the lack of a single treasury account probably itself reflected a lack of political consensus on its desirability.



estimated at 1.15 per cent of GDP in 2008 and 2.5 per cent of GDP in 2009, in part resulting from tax cuts that were approved prior to the crisis and not compensated by budget cuts as initially intended in 2009. The increase in the fiscal deficit from 2 per cent of GDP in 2007 to 7 per cent of GDP in 2009 reversed the trend in place since 2000. The excessive deficit procedure under the SGP was initiated in 2008 due to the deficit overrun.<sup>10</sup> As a consequence public debt escalated from 45 per cent of GDP in 2007 to an estimated 51 per cent in 2009.

Overall, expenditure control remains relatively weak. The 2010 Bank Public Expenditure Review<sup>11</sup> (PER) stressed the need to better align budgetary allocations within a mid-term consistent framework, a point that the 2003 PER had stressed but where apparently progress had been limited. Some MTEF elements were introduced with the new Law on Public Finance of 2009 and the first adoption of the Medium-Term Financial Plan of the State in late July 2010. Despite the national and supra-national rules and reforms in tax administration, Poland could not contain its deficit or debt-to-GDP ratios. Fiscal rules could not substitute for political fragmentation and were not useful in a crisis.

The fiscal situation in 2009 led the government to revise the Public Finance Act to strengthen commitment to (a) a level of public debt lower than 60 per cent of GDP, (b) a medium term framework for the planning of public expenditure; (c) introduction of performance-based budgeting; (d) further consolidation of government (reducing fragmentation); (e) stronger control and internal audit, and (f) separation of EU funds from other items in the state budget. The revised Public Finance Act strengthens the previous safety thresholds and requires additional corrective actions if the debt exceeds 55 per cent of GDP.

For Poland's expenditure-based adjustment to succeed, the country needs to address the political and economic fragmentation that has put upward pressure on expenditures and delayed fiscal adjustments. Recent legal initiatives, including the revision of the Public Finance Act and the reform of social security, could ease such pressures; the latter will reduce the fiscal risk that could arise from the growing elderly population. Going forward, Poland's fiscal consolidation strategy includes plans for two new fiscal rules: (a) to limit the growth in discretionary budgetary spending to 1 percent over inflation over the next few years; and (b) over the longer run, introduce a fiscal rule through a new public financial stability law to prevent a pro-cyclical fiscal pattern in public finances. The institutional reforms that commenced in 1998 need to be strengthened to contain political fragmentation, recent legislation reduces institutional fragmentation but does not strengthen the powers of the fiscal authorities or constrain parliamentary powers to revise the budget. Lacking strong fiscal powers the authorities may find it difficult to enforce (top-down) fiscal envelopes for the whole public sector.

#### 4.2 *Russia*

After the transition began in 1991, the building of fiscal institutions in Russia proceeded slowly. A highly fragmented fiscal system emerged; Federal Government expenditures were less than half of total public expenditures with the rest accounted for by the sub-national governments. The fragmented fiscal structure meant fiscal outcomes were hard to contain placing the country in a weak position as it faced the 1998 crisis. In the pre-1998 period weaknesses in tax policy, tax administration and budgetary management reinforced each other. The lack of adequate expenditure

<sup>10</sup> In 2009, despite a preparation to reduce state expenditures by 10 per cent, state related expenditures, excluding EU-related spending, increased by 20 per cent in current prices during the first half of the year, but the July supplementary budget changed the 2009 to cut expenditures helping contain the general budget deficit to about 6 per cent of GDP.

<sup>11</sup> Public Expenditure Reviews by the World Banks assess the fiscal policy and institutions, particularly as they relate to fiscal expenditures.

control and the inability to collect revenues meant the authorities used noncash mechanisms to settle budgetary commitments. They accumulated arrears. In fact, *ad hoc* expenditure cuts and budgetary arrears became pervasive at all levels, including in extra-budgetary funds and sub-national governments. The Federal Government accounted for the bulk of the overall public deficit (expenditures were pushed up by rising transfers and interest payments); its fiscal space was shrinking as revenues were declining (from 15.6 per cent of GDP in 1992 to 11.6 per cent in 1997). In response, the Federal Government tried to control the deficit by cutting expenditure (from 26 per cent of GDP to 18.4 per cent) but did so in an *ad hoc* manner. Russia's fragmented political system blocked efforts at fiscal reform; for instance the Duma rejected a fiscal reform package in July 1998 just before the financial crisis hit.

During the crisis, the economy contracted and the debt-to-GDP ratio reached over 90 in 1999. With a new government in place, the authorities undertook a dramatic shift in fiscal and macroeconomic policy, and by 2002 the general government was running a surplus which it maintained until the crisis of 2008-09. But, the financial crisis of 1998 was clearly a watershed event for Russia's fiscal institutions and fiscal performance and it led to a turnaround among politicians and technocrats. The cooperation between the executive and the Duma increased, beginning with the approval of a tough 1999 budget that included significant reductions in expenditure including at the regional and the local levels. Changes went beyond the approval of tight and demanding budgets. The government abandoned the practice of using tax offsets to pay its obligations and this helped foster revenue mobilization and reduced barter transactions in the economy. In addition, control over regional and local government finances increased, as did the share of taxes channeled through the federal budget. From 2000 to 2005, the authorities overhauled fiscal institutions in several core strategic areas beginning with the reform of the tax system, including the adoption of a flat income tax and reduction in the corporate income tax rate. Tax administration reforms efforts complemented tax policy initiatives. In 2002, a single Treasury Account brought all government expenditures together at the Central Bank. The revision of the budget code laid out sound principles for budget preparation, execution and reporting covered the sub national governments and established limits on their deficits and borrowing capacity. In a significant step, the government undertook to manage its oil revenues better and introduced an Oil Stabilization Fund (created in 2003 and operational in 2004); later in 2008 this Fund would be split in two: (a) a Reserve Fund (aiming to insure against price volatility) and (b) a National Welfare Fund (for inter-generational equity.)

There were questions however about the sustainability of the adjustment because it initially held social payments and wages below inflation. However, as the finances of the public sector improved, aided by increases in oil revenues which by 2000 had already reached 7.5 per cent of GDP, concurrently, expenditures rose and the non-oil fiscal deficit to non-oil GDP that had reached a surplus in 2000 became a growing deficit thereafter. This development however did not impair a rapid reduction of the overall public debt, a reduction that was aided by the rapid growth in oil export revenues, non-oil revenues to GDP, and negative real interest rates.

The reform of the fiscal relationship across the levels of government proceeded gradually, beginning with the passing in 2003 of a comprehensive decentralization reform that radically reshaped the powers of the local governments in Russia. This legislation was enacted in 2006 and full implementation commenced in January 2009. In addition, the 2004 Budget Code and the 2004 Federal Law on the Distribution and Assignments between Levels of Government tightened the assignment of spending mandates. Federal grants to regions came under common rules that limited them to equalization, matching and compensation for federal mandates. The use of formulae for equalization transfers as mandated by the Budget Code has replaced previous negotiations between the Federal Government and the regions. The legislation endeavored to clarify overlapping

responsibilities between the Federal government and the regions, to eliminate unfunded mandates and to reduce excessive expenditure obligations.

Despite buoyant public sector revenues, fiscal institutional reform continued and focused on second generation reforms that included the introduction of multi-year and performance budgeting (2007), that allowed line ministries to conclude multi-annual contracts and distinguish between the baseline budget and new budget initiatives. The need to respond to the crisis in late 2008, however, led to a suspension of the first multiyear budget adopted in 2007. Further revisions to the Budget code in 2007 tightened the fiscal rules and increased the constraints on extra-budgetary activities of government units and public enterprises, which was complemented with efforts to terminate quasi-fiscal spending by public corporations in which the Russia Federation holds a stake.

As a result of all these reform, Russia's fiscal institutions and fiscal performance improved vastly during the 2000-08 period. These improvements meant that Russia entered the 2008-09 recession in a fiscally strong period, with a large government surplus, a low public debt and sizeable fiscal reserves. In the last quarter of 2008, when the effects of the global crisis were beginning to be felt in Russia, the government responded with an array of policies. Russia's total stimulus package of about 6.7 per cent of GDP over 2008-09 was large when compared to that of other countries. The across-the-board institutional overhaul that took place in the decade after 1998 to addressing the crisis in 2008 and 2009 allowed the government to respond boldly using the room to maneuver created by the substantial level of reserves and the low public debt. As a result, the non-oil federal deficit reached 13.5 per cent of GDP in 2009, and is likely to remain at a similar level in 2010. At the same time, it is estimated that a long-term sustainable level for the deficit is around 4.3 per cent of GDP. The gap between this number and the current deficit implies the magnitude of the adjustment faced by Russia (Bogetic *et al.*, 2010).

Recent spending increases in Russia (which began before the crisis) reflect permanent shifts (in pension and wages, for instance) in a situation where long-term sustainability calls for a significant reduction in the non-oil deficit. The Reserve Fund has been depleted substantially but less than had been feared at the beginning of the crisis. Thus Russia, like Poland, faces significant challenges ahead in further consolidation of its budget. The institutional apparatus, set in place before the crisis, with emphasis on embedding the budget within a mid-term framework can serve to help maneuver the needed adjustment, but it will have to be anchored on a broad political consensus to increase the likelihood of sustainability. The adoption of new rules on oil revenues may signal a greater commitment to fiscal constraint.

#### 4.3 Turkey

The opening and liberalization of the Turkish economy began in 1980 as the country started abandoning strict import-substitution policies. For the next two decades (1980-99) Turkey faced periodic crises which combined stop and go cycles of growth and a rising level of average inflation. But efforts at fiscal adjustment did not take hold. Fiscal and political fragmentation was at the heart of the macroeconomic difficulties. For instance, two episodes during the 1990s (1994-95 and 1998) increased the overall primary surplus of the central government through substantive reductions in expenditures and tax increases, but could not contain the deficit in the rest of the public sector. With the adjustment burden falling on the central government and with a private sector with limited appetite to pay more taxes, the efforts failed. The relative autonomy of various segments of the public sector reduced the fiscal space available to the center and its ability to manage the overall fiscal situation, leading to periodic increases in the overall public sector deficit, inflation and the public sector debt. In addition, underlying these two failed fiscal adjustments during the 1990s were weak coalition governments that could not implement the changes needed to impose hard budget constraints on the rest of the public sector. By 1999, the public sector debt as a percentage

of GDP had grown to 61 per cent from 35 per cent at the beginning of the decade. Meanwhile the ratio of taxes to GDP remained relatively stable, despite a decade of efforts at tax policy and tax administration reform.

In 1999, in the wake of the Russian crisis, an adjustment effort supported by an IMF program focused on curtailing the fiscal powers of the non-central public agencies and enterprises. But, in 2000, the high level of short-term debt refinancing obligations of the public sector induced a fiscal/financial crisis that compromised a weak banking sector. Political and fiscal fragmentation led to a high level of spending and correspondingly large deficits financed by captive public banks. The situation was aggravated by the crawling peg established in 1999 which led the banks to make exchange rate “bets” they lost when the peg failed. Turkey faced one of its most severe crises in 2001. The crisis galvanized the authorities into action. They ruled out debt restructuring and focused instead on ensuring the ability to roll over debt and strengthen longer term sustainability through the generation of high primary surpluses. A critical part of the adjustment was to generate a primary surplus in the rest of the public sector. The adjustment relied as well on indirect taxes (VAT, special consumption tax, petroleum, tobacco, alcohol and motor vehicles) with a lesser contribution of personal and corporate income taxes. Deep structural reforms accompanied the program with a primary focus on the banking sector. Costs of bank restructuring amounted to about 15 of GDP. Turkey obtained sizeable multilateral and bilateral financial support complemented the high primary fiscal surplus to service and manage the debt bulge and to assure the continued availability of international finance. It took longer to reduce the vulnerability of the high level of debt, which was also relatively short-term. In contrast to previous efforts, the rest of the public sector primary balance went from deficit to surplus for the first time since 1980. The GDP did contract by 5.7 per cent in 2001, but rapid recovery followed in 2002 and it grew by 6.2 per cent followed by 5.3 per cent in 2003.

Although the adjustment was undertaken under a coalition government the 2002 election brought in a single party government with an overall majority that went on to conclude the stabilization process and soon thereafter launched an overhaul of its fiscal institutions that the Public Financial Management Control Law (PFMC Law), effective in 2006, consolidated. The PFMC Law reformed the entire cycle from planning and budgeting to legislative scrutiny of budget proposals, internal control and audit, external audit and *ex post* legislative control. The PFMC Law advanced a more consolidated view of the General Government to include Central Government, Social Security Institutions, and Local Administrations. In addition, it assigned responsibilities to a small set of core agencies, reducing fragmentation in decision making: the Ministry of Finance (MOF), the State Planning Organization (SPO) and the (Undersecretariat of the) Treasury. The MOF prepares, executes and reports on the budget; SPO prepares the macro-framework, which is then used by the Treasury to develop the investment budget and manage the public debt (and cash flow). The MOF sets tax policy but a specialized agency (Revenue Administration) collects.

During 2003-06, the nonfinancial public sector primary balance was in surplus as was the central government and the rest of the public sector. The period saw a rapid decline in the public sector debt relative to the economy. Turkey was helped by rapid growth. The general government gross debt-to-GDP ratio fell from 78.6 per cent of GDP in 2001 to 39.5 per cent of GDP in 2008. By the last quarter of 2008, the global crisis had affected Turkey. The authorities undertook a fiscal expansion in response to the crisis. The public sector primary fiscal balance went from a surplus of 4.1 per cent of GDP in 2007 to a surplus of 3.4 per cent in 2008 to balance in 2009. The decline in the primary fiscal balance was due to discretionary measures which amounted to 1.2 per cent of GDP with the remainder coming from automatic fiscal stabilizers. These came mostly as transfers to the health and social security systems. In addition the government introduced temporary tax cuts (VAT) to induce consumption of durables; a moderate package of employment support measures would be introduced as unemployment increased.

The ability of the government to respond was certainly aided by the fiscal space that had been gained and the low level of public debt. Yet as the crisis recedes, Turkey will need to ensure budgetary prudence and to further strengthen its fiscal institutions. To lock in gains and guide the future fiscal stance, the government has proposed adopting a fiscal rule. Draft fiscal legislation sets an annual deficit ceiling that adjusts to cyclical conditions while converging gradually to the medium-term deficit target. The draft legislation also proposes important improvements to Turkey's public financial management procedures, including more transparent and comprehensive reporting of fiscal projections and outturns, tighter oversight of local government borrowing, and strengthened controls to deliver spending outturns more in line with the budget. Recent announcements indicate that the adoption of the rule may be delayed.

## **5 Conclusion**

ECA countries, including the three countries studied in some detail, saw improvements in the quality of fiscal institutions and in fiscal outcomes during the period under study. The improvements in fiscal outcomes before the crisis were aided substantially by a favorable international environment but also by improved fiscal institutions that reduced institutional fragmentation and enhanced transparency through significant investment in supporting systems. Political consensus (or lack thereof) has been a major determining factor behind the types of institutional progress and fiscal consolidation that has taken place. Periods of political consolidation have favored institutional improvements. In addition, the impetus for institutional reforms has gained momentum after the recent crisis.

At the eve of the economic crisis, the three countries seemed better prepared in terms of their fiscal accounts, than in the earlier 1998 crisis period. By 2007, they had all reduced their public debt-to-GDP ratios and improved primary fiscal balances. But large increases in tax revenues and GDP allowed expenditures to accelerate though the deficit fell: fiscal controls did not extend as well as they could have to expenditures. Neither was there substantial improvement in problems areas or rationalization of expenditure patterns. Russia had accumulated substantial international reserves from oil exports by 2007 but it succumbed to upward pressures on expenditures. Russia's high reserves saw it through the crisis, but the time is ripe for a more critical look at public sector expenditures and further constraints on the use of the oil fund. Turkey's expenditure cuts were remarkable until the latter half of the 2000s but Turkey can reduce its risks further through a more complete consolidation of the public sector finances and a renewed commitment to expenditure rationalization. Among the three, Poland, which also raised expenditures, is the only one that had a rise in the public debt-to-GDP ratio before the crisis, and this happened despite the multiplicity of rules and constraints it adopted in the EU accession process. For a variety of reasons, Poland weathered the crisis better, but its fiscal accounts continue to be endangered by rising debt. A political will to tackle social expenditures is critical to Poland's ability to further contain its fiscal outcomes. It is difficult to assess the impact of the institutional reforms in the crisis itself. The empirical evidence indicates that improved institutional frameworks were no match for the unprecedented swings in the macroeconomics in the region, but countries were able to maneuver more efficiently and decisively than in previous episodes in the last two decades.

Over the longer term, the crisis is likely to have two impacts. First, longstanding reforms in social programs, which had lost momentum due to the easy financing of the 2000s, are now more likely to be reenacted, and lead to more sustainable public finances in the future. Second, the momentum for more binding fiscal rules is gaining strength, this time accompanied by substantial improvements in the underlying institutional capacity to enforce them. The principal weakness looking forward, of course, remains the unpredictability of the political process.

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# FISCAL POLICY IN COLOMBIA AND A PROSPECTIVE ANALYSIS AFTER THE 2008 FINANCIAL CRISIS

*Ignacio Lozano\**

*The purpose of this study is twofold: First, it provides an empirical characterization of fiscal policy in Colombia over the last decades, by assessing the three most relevant macroeconomic factors: the behavior of fiscal policy over the business cycle; whether it has been coherent with the long-term debt sustainability; and, whether it has been a significant source of macroeconomic volatility. The results are compared internationally. Second, it evaluates the fiscal stance of the Colombian authorities during the 2008 global financial crisis, and examines the adoption of a fiscal rule as an appropriate tool to manage public finances beyond the recovery phase.*

## 1 Introduction

The purpose of this study is twofold: first, it provides an empirical characterization of fiscal policy in Colombia over the last decades, by assessing the three most relevant macroeconomic factors: (i) the behavior of fiscal policy over the business cycle; (ii) whether it has been coherent with the long-term debt sustainability; (iii) whether it has been a significant source of macroeconomic volatility. The results are compared internationally.

Second, it evaluates the fiscal stance of the Colombian authorities during the 2008 global financial crisis, and examines the adoption of a fiscal rule as an appropriate tool to manage public finances beyond the recovery phase.

To meet the first objective, a standard fiscal reaction function was estimated, and other customary empirical techniques (fiscal impulses and cointegration test) were applied. The analysis led to the conclusion that discretionary fiscal policy in Colombia has been historically pro-cyclical; that it has been closely consistent with the long-term condition of debt sustainability; and that its volatility has been decreasing in recent years. Regarding the second objective, the analysis revealed that the Colombian fiscal authorities adopted a rather *neutral* posture during the crisis – a discretionary counter-cyclical (or pro-cyclical) fiscal plan to compensate for the decline in real activity has not been developed mainly because of the lack of fiscal space.

Two short and medium-term scenarios were considered to assess the fiscal effects of the crisis: one with a moderate impact and a quick economic recovery; and the other, with a slightly more severe impact and a slower growth recovery. As a result of the economic slowdown, the analysis shows that the government finances are likely to suffer a substantial decline: tax revenues will drop more than –4 per cent in 2010 (in real terms); the primary balance will be negative between 2009 and 2011 (higher than –1 per cent of GDP); and debt levels will reach those attained at the beginning of the decade (above of 40 per cent of GDP), when the central government finances were highly fragile.

Despite this short-term fiscal deterioration, the Colombian fiscal indicators had been improving over the pre-crisis period, as a result of a favorable domestic and external macroeconomic environment as well as various fiscal reforms. Going beyond the recovery phase,

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the adoption of a fiscal rule on government accounts would be a suitable tool to help consolidate the public finances in the long term. Prospective exercises were made to support the benefits of this tool. Overall this discussion is organized as follows: an empirical characterization of fiscal policy in Colombia over the last decades is provided in Section 2. The fiscal stance of the authorities during the 2008 global financial crisis is described in Section 3. An assessment of a fiscal rule to be applied to the long-term public finances is presented in Section 4. Some conclusions are drawn in Section 5.

## 2 Empirical characterization of the fiscal policy: the three major issues

### 2.1 The fiscal stance throughout the cycle

A large number of empirical studies have found that the fiscal stance in industrial countries tends to be either a-cyclical or counter-cyclical, which is consistent with the stabilizing role of fiscal policy.<sup>1</sup> By contrast, other studies for developing countries – low and middle-income countries – or for emerging economies like Colombia, have usually concluded that their fiscal policies have a pro-cyclical character.<sup>2</sup> Among the reasons that explain pro-cyclical policies are: weak fiscal institutions, borrowing constraints, and the so-called *voracity effect*.<sup>3</sup> Gavin *et al.* (1996) tested some of these factors for Latin American countries (LAC) in the nineties, reaching valuable conclusions. In particular, they found out that the fragile relationship of Latin America with the international financial markets was detrimental to the adoption of counter-cyclical policies. This occurs since these countries often face a loss of market confidence, during economic downturns, that intensifies borrowing constraints.

The Colombian fiscal policy through the cycle is explored empirically in this section, to validate the results found for other LAC. First, a reduced form model of a traditional reaction function is employed. The results are compared at an international level. Second, the fiscal impulses technique is applied which permits to do an annual evaluation of the fiscal stance. Assessing the causes of the fiscal posture during the cycles in Colombia is beyond the scope of this discussion.

#### 2.1.1 The fiscal reaction function

The reduced form of the fiscal reaction function relates the fiscal balances in  $t$  (overall or primary),  $Bal_t$ , in percent of GDP, to the lagged (or contemporaneous) output gap,  $Gap_{t-1}$ , controlling the lagged debt-to-GDP ratio,  $Debt_{t-1}$ , and the lagged dependent variable. Equation (1) shows this postulation:

$$Bal_t = \alpha + \beta GAP_{t-1} + \lambda Debt_{t-1} + \delta Bal_{t-1} + \varepsilon_t \quad (1)$$

where  $\varepsilon$  is an i.i.d. disturbance. In equation (1),  $\beta < 0$  is evidence of a pro-cyclical policy ( $\beta > 0$  counter-cyclical) which means that balance-to-GDP ratio falls when actual output increases relatively to potential output. Regarding the relationship between debt and fiscal balance, which

<sup>1</sup> Galí (1994); Perotti (1999); Silgoner *et al.* (2003); Perotti (2004).

<sup>2</sup> Manasse (2006); Alesina and Tabellini (2005); Calderón, Duncan and Schmidt-Hebbel (2004); Kaminsky, Reinhart and Végh (2004); Talvi and Végh (2000); Gavin and Perotti (1997).

<sup>3</sup> According to Manasse (2006, p. 7), the “voracity” effect takes place “in economies lacking strong legal and political institutions. In such circumstances, a windfall in revenue exacerbates the struggle for fiscal redistribution, as each interest group tries to appropriate its share without fully internalizing the consequences of its own demand on general taxation. The lack of coordination, in this version of the familiar common pool problem, is ultimately responsible for a more-than-proportional increase in spending”.

was first used by Bohn (1988) to test government solvency (sustainability), it is required that  $\lambda > 0$ . We will return to this subject in the next section.

Empirically, the endogenous variable of equation (1) could be estimated using three possible alternatives: actual balance,  $Bal$ ; cyclical-adjusted balance,  $Bal^{CA}$ ; or using only the cyclical component of the balance,  $Bal^C$ , which is given by the difference between the first two concepts (i.e.,  $Bal^C = Bal - Bal^{CA}$ ). As it is shown below, in the first case,  $\beta$  reflects both the automatic stabilizer size and the endogenous change of the discretionary fiscal policy. In the second case,  $\beta$  gives the endogenous response of the fiscal policy to the cycle, precisely the indicator explored in this section. In the third case,  $\beta$  reflects exclusively the size of the automatic stabilizers.<sup>4</sup> Regarding the fiscal balance definition, it must include the interest payments on the public debt (overall balance, or  $Bal$ ) or exclude these expenditures (primary balances,  $PrimBal$ ). This second option is closer to the government budget constraints and reflects better the discretionary actions of the fiscal authorities.

$Bal \longrightarrow \beta = \text{automatic stabilizer} + \text{changes in endogenous policy}$

$Bal = Bal^{CA} \longrightarrow \beta = \text{endogenous response of fiscal policy}$

$Bal^C \longrightarrow \beta = \text{automatic stabilizer}$

Table 1 shows the estimation of the reaction function for Colombia employing annual data for the central government from 1960-2008. The outcomes are compared internationally with results derived from the Fatás and Mihov (2009) research.<sup>5</sup> Both for Colombia and for the OECD countries, the estimations were made through OLS (also with the instrumental variables method to control endogeneity problem) and incorporate dummy variables to capture possible changes in the fiscal regimes (structural breaks).<sup>6</sup> In both studies, the cyclical adjusted balances are estimated using the OECD methodology.<sup>7</sup>

The following two findings must be highlighted: first, the long-term fiscal position of the Colombian government has been pro-cyclical ( $\beta < 0$ ). The different options of measuring the endogenous variable ( $Bal$ ,  $Bal^{CA}$ ,  $BalPrim$ ,  $BalPrim^{CA}$ ), are statistically significant and support this conclusion. Using the cyclically-adjusted balance ( $\beta = -0.155$ ), the parameter means that for each percentage point increase in the output gap, the structural balance deteriorates by about one sixth-part. If we evaluate the reaction function with the cyclically-adjusted primary balance ( $BalPrim^{CA}$ ), as recommended by some authors, the degree of pro-cyclicality is maintained ( $\beta = -0.139$ ), and renders a better level of statistical significance (99 per cent).<sup>8</sup>

The second outcome refers to results at an international level. In particular, the European Union governments maintained, on average, a pro-cyclical stance between 1970 and 2007 ( $\beta = -0.145$ ), and only for the U.S., did the authors find evidence of a counter-cyclical stance ( $\beta = 0.133$ ). For the Japan and the U.K cases, clear conclusions could not be drawn since the parameters were not statistically significant. Regarding the size of the automatic stabilizer, the parameter for Colombia is notably lower (0.131) than that of developed countries, where it ranges from 0.26 (for Japan) to 0.46 (for European Union countries).

<sup>4</sup> Fatás and Mihov (2009).

<sup>5</sup> The Fatás and Mihov study was made, mainly, for the 12 major European Union economies (EU), USA, UK, and Japan for the period 1970-2005.

<sup>6</sup> In Colombia, the most significant dummy was detected in 1998, which coincides with a substantial increase in government spending rising from fiscal decentralization and social security programs implemented by the middle of the decade. In the European Union economies, the dummy applies since 1999, before the adoption of the single currency, and after the implementation the Stability and Growth Pact.

<sup>7</sup> For Colombia, see details in Lozano and Toro (2007).

<sup>8</sup> Because of data limitations, it was not possible to calculate the reaction function for sub-period (before and after the break changes in 1998).

Table 1

## Fiscal Reaction Function for Colombia, 1960-2008

Dependent Variable	GAP <sub>t-1</sub>		Debt <sub>t-1</sub>		Dep. Var. Lagged		R <sup>2</sup>
	Coefficient	s.e.	Coefficient	e.e.	Coefficient	s.e.	
<i>Bal</i>	-0.122	(0.061)*	0.047	(0.027)*	0.782	(0.103)***	0.82
<i>Bal</i> <sup>CA</sup>	-0.155	(0.061)**	0.028	(0.026)	0.716	(0.103)***	0.82
<i>Bal</i> <sup>C</sup>	0.131	(0.009)***	-	-	-	-	0.81
<i>PrimBal</i>	-0.096	(0.053)*	0.057	(0.024)**	0.651	(0.099)***	0.61
<i>PrimBal</i> <sup>CA</sup>	-0.139	(0.052)***	0.045	(0.023)*	0.576	(0.098)***	0.63
<i>PrimBal</i> <sup>C</sup>	0.131	(0.009)***	-	-	-	-	0.81

Dependent Variable $Bal^{CA(1)}$							
Zone	$GAP_t$		$Debt_{t-1}$		Dep. Var. Lagged		$R^2$
	Coefficient	s.e.	Coefficient	e.e.	Coefficient	s.e.	
Euro Area (G-12)	-0.145	(0.061)	0.016	(0.006)***	0.721	(0.076)**	0.82
Japan	-0.042	(0.100)	0.005	(0.007)	0.904	(0.069)**	0.78
U.K.	-0.196	(0.127)	0.017	(0.032)	0.837	(0.095)**	0.67
U.S.	0.133	(0.065)***	0.028	(0.014)	0.770	(0.103)**	0.69

Dependent Variable $Bal^{C(1)}$							
Automatic Stabilizers							
Zone	$GAP_t$		$Debt_{t-1}$		Dep. Var. Lagged		$R^2$
	Coefficient	s.e.	Coefficient	e.e.	Coefficient	s.e.	
Euro Area (G-12)	0.464	$(0.005)^{***}$	-	-	-	-	1.00
Japan	0.267	$(0.012)^{***}$	-	-	-	-	0.95
U.K.	0.391	$(0.021)^{***}$	-	-	-	-	0.94
U.S.	0.293	$(0.013)^{***}$	-	-	-	-	0.95

Source: Calculations of the author for Colombia and Fatás and Mihov (2009) for the OECD countries.

Notes: CA = Cyclically-adjusted, C = Cyclical component.

\*\*\* significance at 99 per cent level, \*\* significance at 95 per cent level, \* significance at 90 per cent level.

<sup>(1)</sup> From Fatás and Mihov (2009), period 1975-2007.

### 2.1.2 The fiscal impulses

A fiscal impulse is defined as a change in the cyclically-adjusted fiscal balance between two periods, and can be assessed both with the overall balance ( $\Delta OB^{CA}$ ) and primary balance ( $\Delta BP^{CA}$ ). These indicators were compared with respect to output gap, in order to establish the fiscal stances through the business cycle. The advantage to use fiscal impulses rather than a reaction function is that a fiscal stance can be assessed annually. Figures 1 and 2 show the results for a shorter period (1994-2008).<sup>9</sup> The slope sign of the trend line captures the fiscal posture (on average) along those years. The negative correlations between fiscal impulses and the output gap point out to the dominance of pro-cyclical fiscal postures in Colombia in recent times. A pro-cyclical fiscal policy was also evident in the economic expansion of recent years (2003-07), in which the economy grew at an average rate of 5.8 per cent. Throughout the entire period considered, only four of the fifteen observations (years) displayed counter-cyclical fiscal stances.

## 2.2 Debt sustainability

From a macroeconomic perspective, debt sustainability is the second important empirical fact that must be considered. According to equation (1), if  $\lambda$  is positive, the government tries to increase the fiscal balance in order to react to the existing stock of public debt and comply with the inter-temporal budget constraint (IBC). The standard interpretation of such a result could be seen as a sign of a *Ricardian fiscal regime*. However, the literature has emphasized that sustainability of public finances would require not only that  $\lambda$  be positive but also *sufficiently* positive.<sup>10</sup> The results for Colombia show that  $\lambda = 0.057$  when the reaction function is evaluated with the actual primary balance, as dependent variable, and that  $\lambda = 0.045$ , when it is evaluated with the cyclically-adjusted primary balance (Table 1). The latter parameter has a higher significance level (95 per cent). These results provide evidence that the Colombian central government has been historically coherent with the IBC. Internationally, the clearest evidence of fiscal sustainability is offered by the U.S. and the G-12 countries of the European Union.

### 2.2.1 Cointegration analysis

A cointegration analysis between the tax revenues ( $t_t$ ) and the primary expenditures ( $g_t$ ) of the central government was performed as an alternative technique to assess fiscal sustainability, and as a means to complement the analysis of parameter  $\lambda$  from the fiscal reaction function; in particular, it was important to assess if the size of such parameter was positive enough. The idea behind co integration analysis is that if we assume that the discount rate ( $\delta$ ) of the IBC follows a stationary process, as it is empirically commonplace, we can expect a long term relationship between these two variables (Hakki and Rush, 1991).<sup>11</sup> If this is the case, we use the reduced-form model  $t_t = (\sigma_0 + \sigma_1 D_t + \beta g_t + \varepsilon_t)$ , where  $\sigma$ 's and  $\beta$  are the cointegration parameters,  $D$  denotes dummies – capturing the possible structural changes –, which are estimated endogenously using Gregory and Hansen (1996) tests, and  $\varepsilon$  is the error term. Because of data availability

<sup>9</sup> Quadrants I and III reflect a counter-cyclical stance as the fiscal balance improved with positive changes in output gap, and quadrants II and IV reflect the opposite case (pro-cyclical stance).

<sup>10</sup> Afonso (2005). See details in Afonso, p. 14 and 24.

<sup>11</sup> The budget constraint could be expressed as  $b_t = E_t \sum_{i=1}^{\infty} \delta^{-i} (t_{t+i} - g_{t+i})$ , where  $b_t$  is the debt to GPP ratio,  $E_t$  is the expectative operator, and the no-Ponzi game condition is imposed.

Table 2

## Unit Root Test

test	Actual Data				Cyclically-adjusted Data			
	$t_t$	$\Delta t_t$	$g_t$	$\Delta g_t$	$t_t^{ca}$	$\Delta t_t^{ca}$	$g_t^{ca}$	$\Delta g_t^{ca}$
ADF	2.398	-6,076*	1.403	-16,1*	2.090	-13,48*	2.053	-17,701*
PP	0.222	-15,525*	0.193	-38,534*	0.161	-15.115*	0.398	-33,425*
KPSS	1,068*	0.139	1,014*	0.079	1,077*	0.133	1,131*	0.083

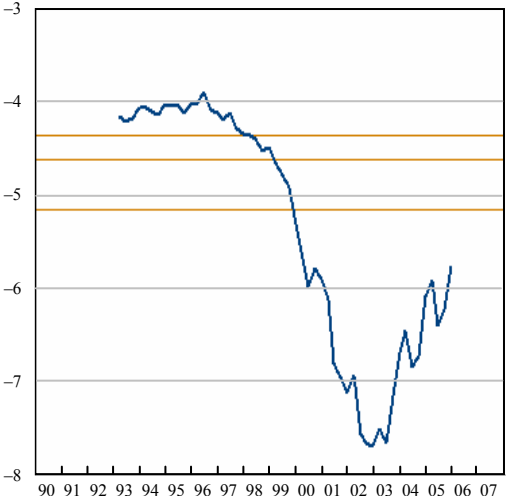
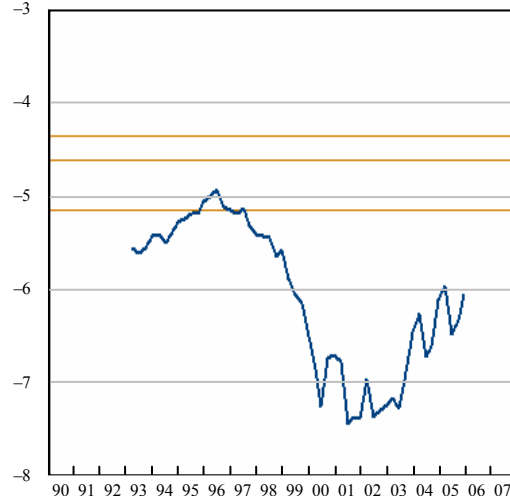
Notes:

ADF: Dickey-Fuller-Augmented; PP: Phillips-Perron; and KPSS Kwiatkowski-Phillips-Schmit-Shin.

\* 99 per cent of significance level.

Table 3

## Cointegration Test with Structural Break (Gregory-Hansen Test)

Actual Data				Cyclically-adjusted Data			
$t_t = a + a_1 D_t + \beta g_t + \varepsilon_t$				$t_t^{ca} = a + a_1 D_t + \beta g_t^{ca} + \varepsilon_t^{ca}$			
ADF	-7.451	Break	2003Q1	ADF	-7.45	Break	2001Q3
							

Note: Critical Values ADF from Gregory-Hansen (1996):  $a(1\%)$ -5.13,  $b(5\%)$ -4.61, and  $c(10\%)$ -4.34.

constraints, this cointegration analysis was made for a shorter period with quarterly data (from 1990Q1 to 2008Q4).

Initially, both the unit root and the cointegration tests were checked as well as the long-term causality test between  $(t_t)$  and  $(g_t)$ , through the Vector Error Correction Model, VECM. Two important findings emerged. First, variables were co integrated only considering a structural break in 2003Q1 (Table 2), which coincided with the adoption of some fiscal reforms known as

“second-generation reforms”, implemented to adjust government finances.<sup>12</sup> Second, there was evidence in favor of the expenditures-to-revenue-long-term determination-hypothesis, which means that the government spending has been determining the dynamics of its revenues (Table 3).<sup>13</sup> On the basis of these results, the fiscal sustainability test using Dynamics OLS (DOLS) and the sustainability test of Quintos (1995) were performed. The reduced-form model employed can be expressed as:

$$t_t = \sigma_0 + \sigma_1 D_t + \beta g_t + \sum_{-q}^q \gamma_q \Delta g_{t-q} + \varepsilon_t \quad (2)$$

where the forth term on the right side of (2) is used to control the short-term dynamic of the exogenous variable. Tables 4 and 5 display the results. Because the parameter  $\beta$  ( $\beta=0.48$ ) is neither (statistically) close to one (which is the case of a *strong sustainability condition*) nor close to zero (*unsustainability condition*), we can conclude that the fiscal stance in Colombia, during the last two decades, has been *sustainable but in a weak sense* ( $0 < \beta < 1$ ), which in practice means that the government has been compelled to make debt roll-over (partially or totally).<sup>14</sup>

### 2.3 Volatility

The volatility of fiscal policy is the third empirical aspect to be examined. According to the reaction function, equation (1), any exogenous discretionary fiscal decision, which is not related to the debt level or to the state of the economy (output gap), is captured by the error  $\varepsilon_t$ . Consequently, the error behavior can be used to analyze the volatility of the discretionary fiscal policy, and therefore to get an idea of the role played by fiscal policy, from a macroeconomic volatility perspective. Table 6 shows errors volatility for Colombia since 1960. The results are compared with fiscal volatility figures found by Fatás *et al.*, (2009) for major OECD countries. In both cases, the overall actual balance is used as endogenous variable.

Fiscal volatility, measured by the error's standard deviation (SD), was 0.84 for the overall period. Looking at sub-periods, the nineties registered higher fluctuations of the residuals ( $SD = 1.37$ ) than those of the seventies and eighties ( $SD = 0.61$ ). The highest volatility reached in the nineties was partially associated to the public spending commitments of the Political Constitution of 1991, which generated a large deficit and high-debt levels for the central government by the turn of the century.

It is important to note that the highest fiscal volatility in Colombia, during the Nineties, coincides with the highest level of economic growth volatility. However, this indicator has been decreasing in recent years, facilitating macroeconomic stabilization. Historically, fiscal policy in Colombia has been less volatile than in Japan and the U.K, but more volatile than in the U.S. and the G-20 countries of European Union. For the latter, volatility figures were substantially reduced after the adoption of the single currency in 1999. As was the case in Colombia, fiscal policy in the U.K. and the U.S. was less volatile after 1999.

## 3 The fiscal stance during the 2008 global financial crisis

As described in the previous section, from the 1960s discretionary fiscal policy in Colombia has been pro-cyclical; it has been consistent with the long-term condition of debt sustainability – although in a weak way, particularly over the last two decades; and it has registered decreasing

<sup>12</sup> The fiscal reforms are described in (Lozano, 2009).

<sup>13</sup> Table 3 shows that the error correction term ( $\delta$ ) is statistical significant only in the income equation.

<sup>14</sup> More details on these results are offered in Lozano and Cabrera (2009).

Table 4

## Revenue and Expenditures Nexus – Estimation Through the VECM Model

Actual Data				Cyclically-adjusted Data			
$\Delta t_t$		$\Delta g_t$		$\Delta t_t$		$\Delta g_t$	
$\alpha_0$	0.01 (0.001)	$\hat{\alpha}_0$	0.002 (0.002)	$\alpha_0$	0.001 (0.001)	$\hat{\alpha}_0$	0.002 (0.003)
$\alpha_1$	0.067 (0.136)	$\hat{\alpha}_1$	-0.439 (0.229)***	$\alpha_1$	-0.006 (0.123)	$\hat{\alpha}_1$	-0.527 (0.227)**
$\alpha_2$	-0.306 (0.115)*	$\hat{\alpha}_2$	0.266 (0.193)***	$\alpha_2$	-0.411 (0.108)*	$\hat{\alpha}_2$	0.349 (0.200)**
$\beta_1$	0.084 (0.084)	$\hat{\beta}_1$	-0.882 (0.142)*	$\beta_1$	0.063 (0.077)	$\hat{\beta}_1$	-0.856 (0.142)*
$\beta_2$	0.328 (0.087)*	$\hat{\beta}_2$	-0.276 (0.147)**	$\beta_2$	0.274 (0.078)*	$\hat{\beta}_2$	-0.277 (0.145)*
$\delta$	-0.604 (0.177)*	$\hat{\delta}$	0.201 (0.298)	$\delta$	-0.419 (0.156)*	$\hat{\delta}$	0.196 (0.289)

## Causality Analysis

Actual Data			Cyclically-adjusted Data		
Ho	Statistic	P-Value	Ho	Statistic	P-Value
$\beta_1 = \beta_2 = 0$	27.440	0.000	$\beta_1 = \beta_2 = 0$	23.792	0.000
$\hat{\alpha}_1 = \hat{\alpha}_2 = 0$	15.918	0.000	$\hat{\alpha}_1 = \hat{\alpha}_2 = 0$	21.293	0.000

\* Significance at 99 per cent level, \*\* significance at 95 per cent level, \*\*\* significance at 90 per cent level.

Table 5

Cointegration Relationship Through DOLS (Stock and Watson)<sup>(a)</sup>

Actual Data			Cyclically-adjusted Data		
$t_t = \alpha + \alpha_1 D_t + \beta g_t + \sum_{-q}^q \gamma_q \Delta g_{t-q} + \varepsilon_t$			$t_t^{ca} = \alpha + \alpha_1 D_t + \beta g_t^{ca} + \sum_{-q}^q \gamma_q \Delta g_{t-q}^{ca} + \varepsilon_t^{ca}$		
$\alpha$	$\alpha_1$	$\beta$	$\alpha$	$\alpha_1$	$\beta$
0.043	0.033	0.484	0.042	0.033	0.484
(0.012)*	(0.004)*	(0.096)*	(0.012)*	(0.005)*	(0.096)*

Sustainability Test (Quintos)<sup>(b)</sup>

Actual Data				Cyclically-adjusted Data			
Step	Ho	H1	t	Step	Ho	H1	t
1	$\beta = 0$	$\beta > 0$	5.169**	1	$\beta^{ca} = 0$	$\beta^{ca} > 0$	5.050**
2	$\beta = 1$	$\beta < 0$	-5.508**	2	$\beta^{ca} = 1$	$\beta^{ca} < 0$	-5.395**

Notes:

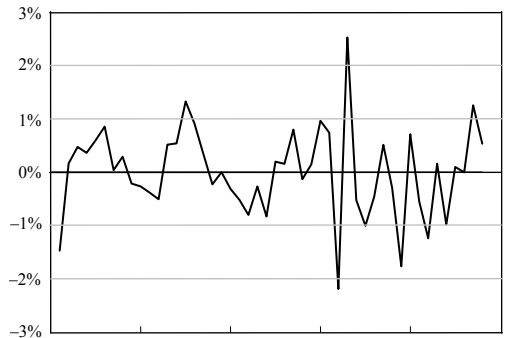
<sup>(a)</sup> Standard error \* Significance at 99 per cent level.

<sup>(b)</sup> Critical Values for Ho: (10%) 1.295, (5%) 1.669, and (1%) 2.387.

\*\* Reject Ho at 99 per cent level of significance.



Table 6

Fiscal Volatility				
Colombia, 1960-2008				
Error Volatility (Fiscal Policy)			Growth Volatility	
	S.D. Total Period 0.839		S.D. Total Period 0.021	
	S.D. by Sub-periods		S.D. by Sub-periods	
	1961-70	0.648	1961-70	0.011
	1971-80	0.610	1971-80	0.018
	1981-90	0.610	1981-90	0.015
	1991-00	1.373	1991-00	0.029
	2001-08	0.815	2001-08	0.021

OECD Countries <sup>(1)</sup>		
Country	Before 1999	After 1999
	S.D. (Fiscal Policy)	
Euro (G- 12)	0.304	0.146
Japan	1.096	2.543
U.K.	1.845	0.899
U.S.A.	0.641	0.135

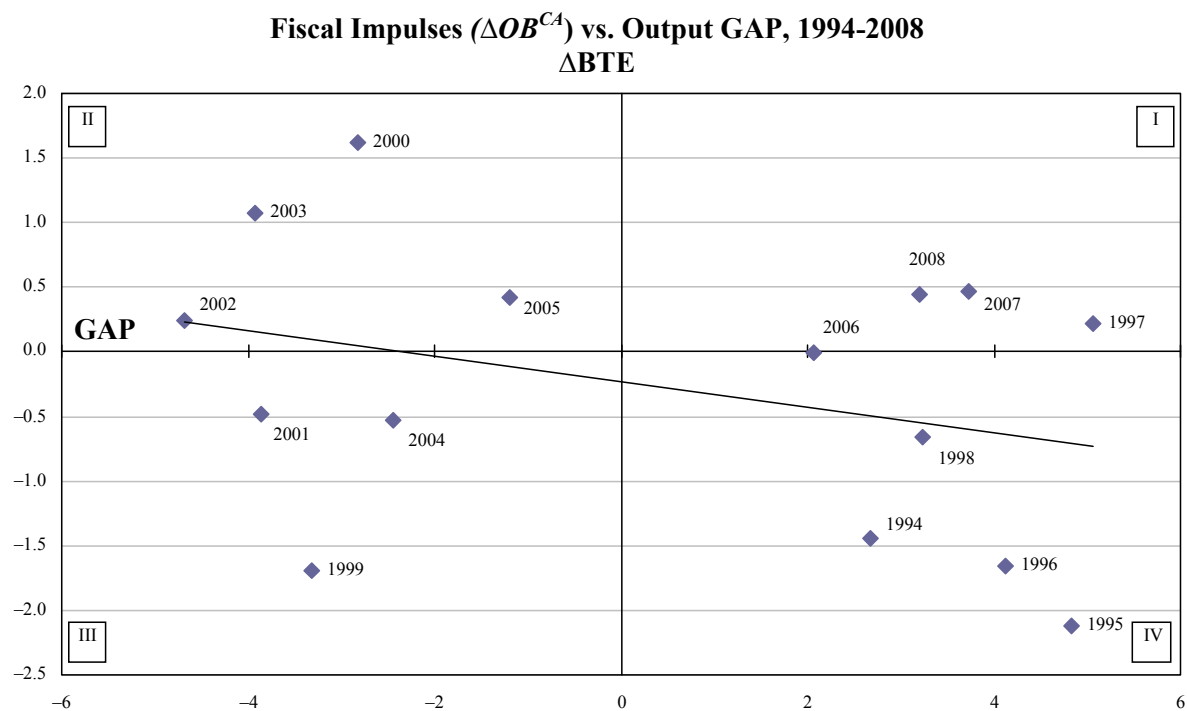
<sup>(1)</sup> From Fatás and Mihov (2009), period 1960-2000.

volatility rates in recent years. Under this scenario, it is important to analyze how the 2008 global financial crisis affected public finances in Colombia, and whether its fiscal authorities are exploring new policy mechanisms conducive to long-term self confidence. These queries are tackled, first, by describing the fiscal indicator behavior during the pre-crisis period; and second, by reviewing the changes in its forecasting, once the slowdown in economic activity became evident.

Regarding the first query, it is evident that in the course of last decade, Colombia's public finances have displayed a remarkable improvement. The fiscal balance of the consolidated public sector (CPS) shifted from a deficit of 4.9 per cent of the GDP in 1999, to a small surplus of 0.1 per cent of the GDP in 2008. In that period, the deficit of the Central Government (CG) went down from 6 to 2.3 per cent of the GDP, and its debt level decreased from 47.5 per cent of the GDP in 2002 to 36 per cent, in 2008. These results were fostered by fiscal reforms designed to increase revenues (three tax reforms) as well as to moderate the growth of public expenditures (two pension reforms and two reforms to transfer resources at sub-national levels, among others). However, the most important factors of such a successful fiscal performance were the favorable internal and external macroeconomic circumstances, including the boom of oil prices.<sup>15</sup>

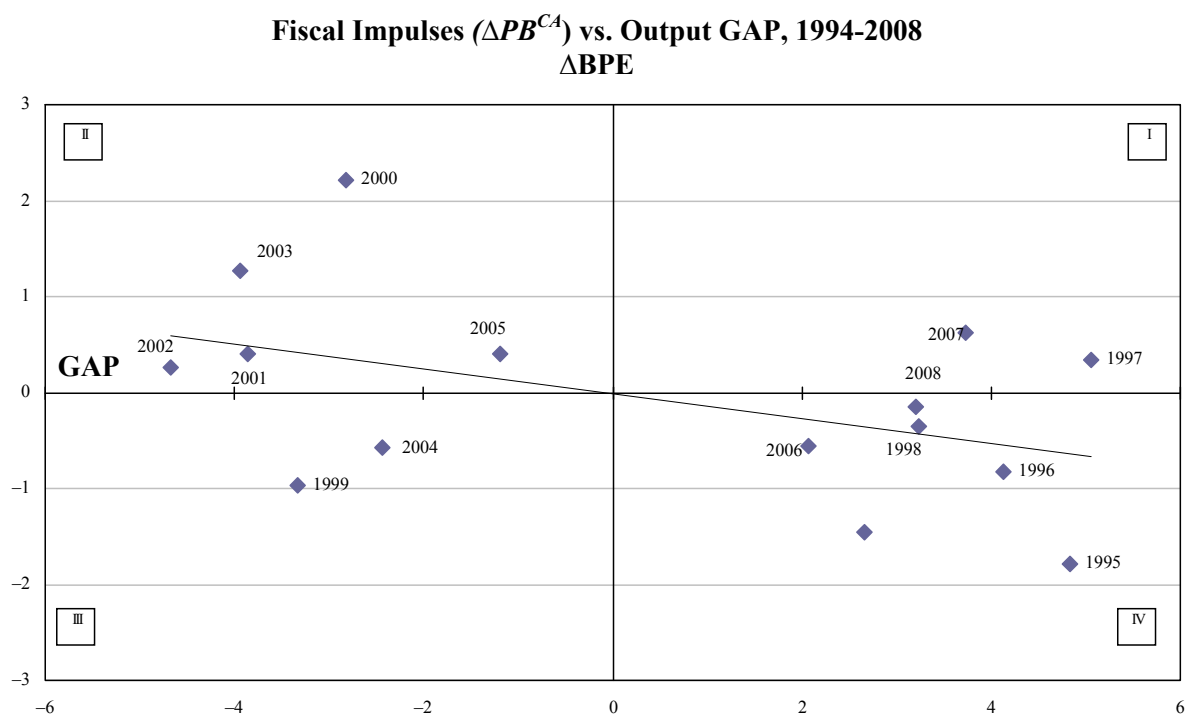
<sup>15</sup> In 2004 for instance, the debt ratio was reduced in 4.5 points of the GDP, out of which 3.6 points were explained both by economic growth and by the appreciation of the COP. See details in Lozano (2009).

Figure 1



Source: Calculations of the author ( $OB^{CA}$ : Cyclically-adjusted Overall Balance).

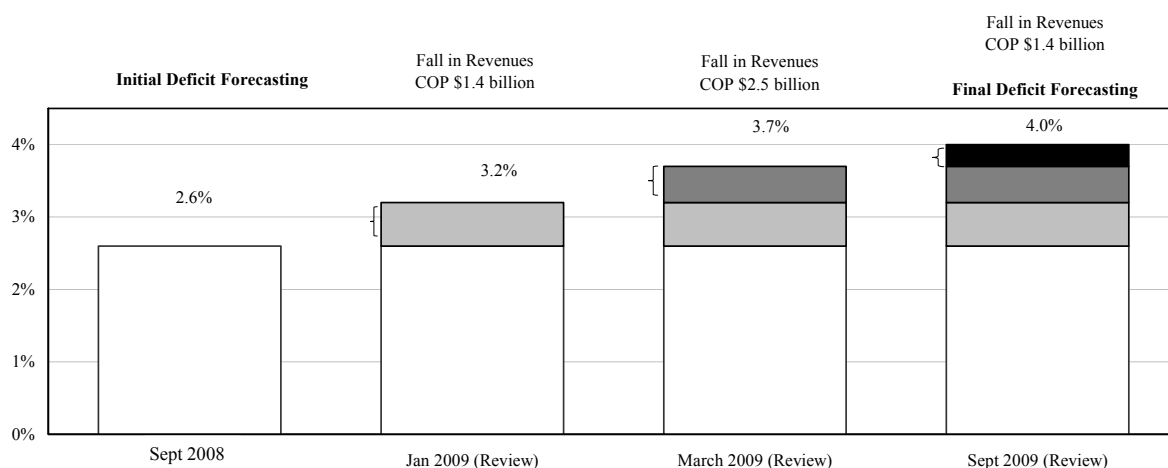
Figure 2



Source: Calculations of the author ( $PB^{CA}$ : Cyclically-adjusted Primary Balance).

Figure 3

**Changes in Fiscal Balance Forecasting for 2009**  
(percent of GDP)



Source: Ministry of Finances.

The sharp economic slowdown that began in the fourth quarter of 2008 and extended into 2009 caused a significant drop in the tax revenues of the central government, and the subsequent deterioration of its fiscal position. The Colombian economy has accumulated negative growth rates for the last four quarters, from  $-1$  per cent (2008Q1) to  $-0.2$  per cent (2009Q3). The external transmission channel (fall in commodity external prices, falling exports, falling remittances, temporary restriction of credit markets, etc.), was the most important channel of transmission of the global crisis. Despite the impact of these factors in tax revenues, fiscal authorities decided to keep the same expenditure levels to avoid a further contraction of the domestic demand, which could exacerbate the economic downturn.

As a result, the deficit of the central government for 2009 rose from an initially expected level of 2.6 per cent of the GDP to a final level of 4 per cent (Figure 3). The changes in fiscal forecasting meant a deterioration of the balance of 1.4 per cent of the GDP. It is anticipated that the fiscal balance will continue to deteriorate in 2010, by the lagged effect of the crisis. Because this larger fiscal deficit is mainly explained by the fall of endogenous revenue and the preservation of public-expenditure rates, this fiscal stance can be typified as a-cyclical.

At the bottom of Table 7, the size of the automatic stabilizer for 2009 is calculated, *i.e.*, the impact of the fall in economic activity on the government's fiscal balance; these results are compared internationally. The economic growth forecast for 2009 was reduced from an initial rate of 5 per cent to a final rate of 0.5 per cent, while the fiscal imbalance increased from 2.6 to 4 per cent of the GDP correspondingly. Therefore, it can be concluded that for each percentage point of lower economic growth, the fiscal deficit deteriorated 0.3 per cent of the GDP. The effect of the crisis for industrialized and emerging economies (G-20) would be, on average, very close to that found for Colombia.<sup>16</sup>

<sup>16</sup> The effect of the automatic stabilizers on the fiscal balance is calculated using standard accounting techniques (see 1 in Table 6). For OECD and emerging economies, see IMF (2009).

Table 7

**Fiscal Balance in Colombia**  
(percent of GDP)

	2006	2007	2008	Forecasting 2009			
				June 08	March 09	Sept 09	Δ Forecasting
<b>Central Government</b>	<b>-3.4</b>	<b>-2.7</b>	<b>-2.3</b>	<b>-2.6</b>	<b>-3.7</b>	<b>-4.0</b>	<b>-1.4</b>
Decentralized Agencies	2.4	1.9	2.1	1.1	1.2	1.2	0.1
Quasi-fiscal Operations	0.3	0.2	0.1	0.3	0.1	0.1	-0.1
<b>Overall Balance</b>	<b>-0.7</b>	<b>-0.6</b>	<b>-0.1</b>	<b>-1.2</b>	<b>-2.4</b>	<b>-2.7</b>	<b>-1.4</b>
Change in Balance	-	-	-	-	<b>-1.2</b>	<b>-0.3</b>	<b>-1.4</b>
<b>Automatic Stabilizers (AS) 2009</b>							
<b>a. Colombia</b>							
Economic Growth (y)	6.9	7.5	2.5	5.0	1.0	0.5	-4.0
Δ in Economic Growth (Δy)	1.2	0.6	-5.0	-	-4.0	-0.5	-4.5
Size of the State (G/Y) <sup>(2)</sup>	30.6	--	--	-	-	-	-
<b>Effect of A. S. on Fiscal Bal<sup>(1)</sup></b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>-</b>	<b>-1.2</b>	<b>-0.2</b>	<b>-1.4</b>
<b>b. OECD Countries and Some Emergent Countries<sup>(2)</sup></b>							
U.S.	-	-	-	-	-	-	-1.5
Japan	-	-	-	-	-	-	-1.4
U.K.	-	-	-	-	-	-	-2.0
Spain	-	-	-	-	-	-	-1.8
Brazil	-	-	-	-	-	-	-0.5
Mexico	-	-	-	-	-	-	-0.8
Argentina	-	-	-	-	-	-	-0.8
G-20 (OECD and Emergents)	-	-	-	-	-	-	<b>-1.2</b>

Source: Ministry of Finance, IMF (2009) and calculations of the author.

<sup>(1)</sup> The size of the Automatic Stabilizer (AS) is estimated through (2):

$$AS \approx (G/Y) * \Delta OUTPUT GAP \quad (1)$$

Assuming that  $\Delta y_t \approx \Delta Output Gap Y_t$ , then:

$$EA_t \approx (G/Y_t) * \Delta y_t \quad (2)$$

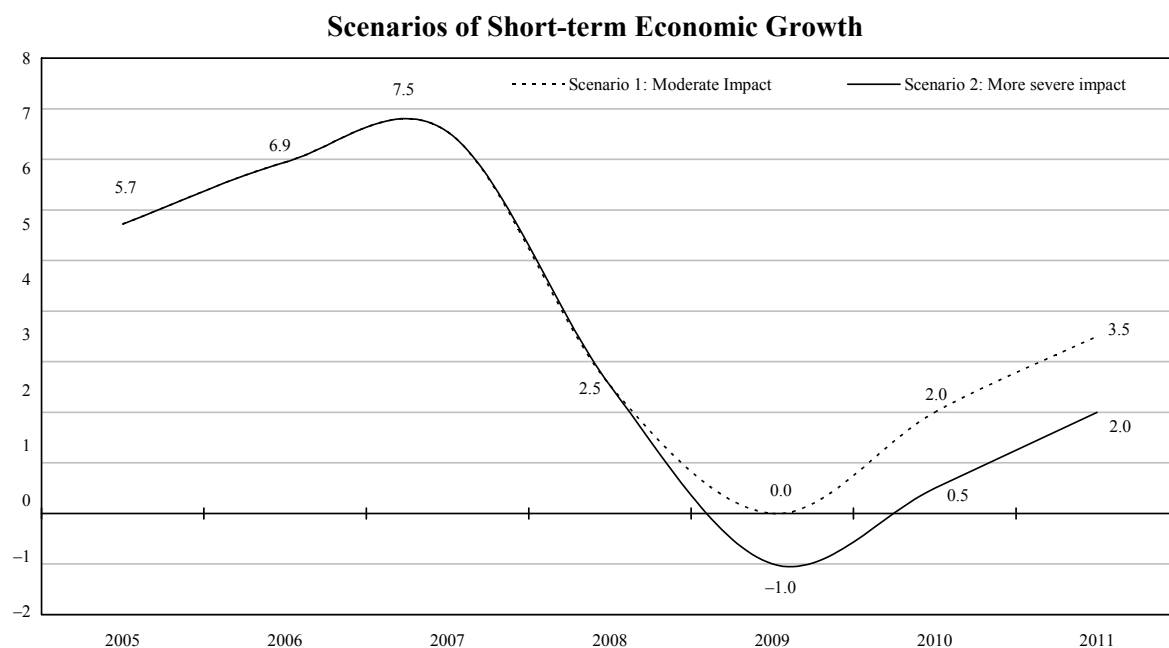
<sup>(2)</sup> From IMF (2009), Table 11, p. 51.

### 3.1 Short and medium term fiscal forecasting

The deterioration of the Colombian fiscal indicators in the short and medium terms will depend on the severity of the economic downturn in 2009 and 2010, and particularly on the recovery path of subsequent years. As will be the case of other Latin American Countries (LAC), economic recovery in Colombia will be conditional to the revitalization of the global economy and, in particular, of the U.S. economy and those of other important trading partners such as Venezuela, Ecuador and the E.U. Figure 4 displays two foreseeable scenarios for Colombia's economic growth for the period 2009 to 2011: Scenario 1 with a moderate impact of the international crisis and a quick economic recovery; and Scenario 2 with a slightly more severe impact and a slower economic recovery.

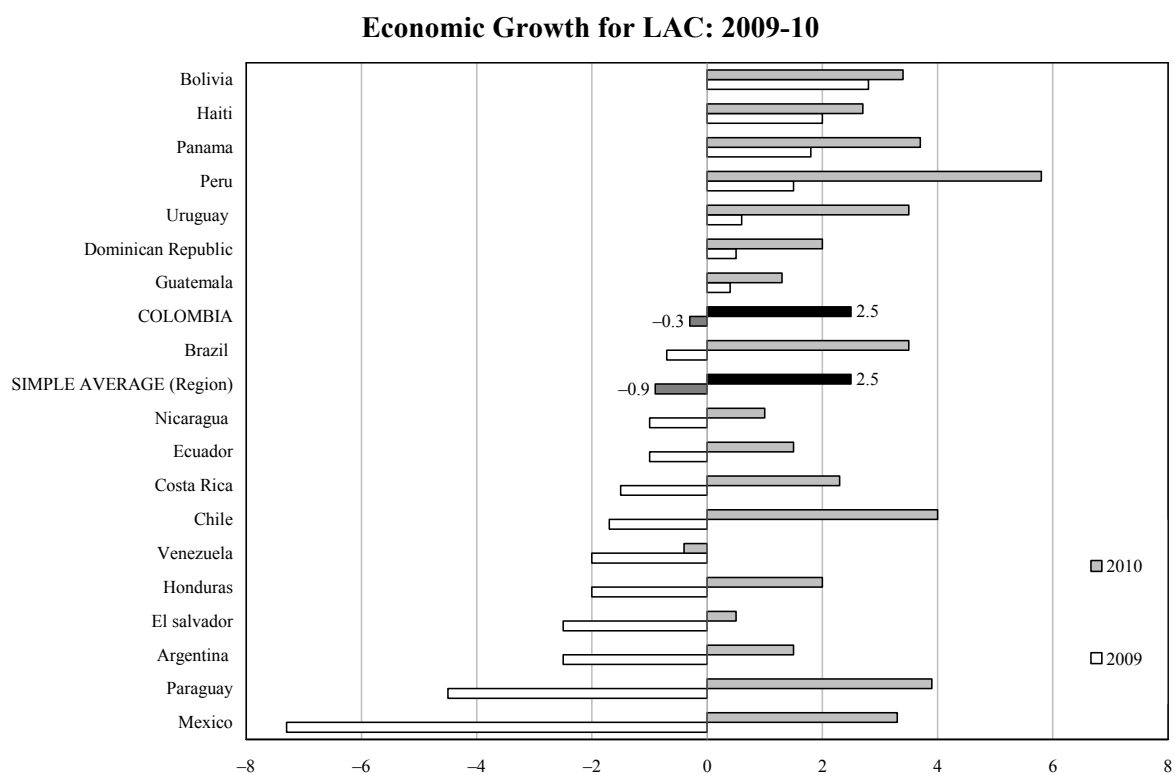
A comparison of the above-mentioned forecasting with the WEO-IMF growth-forecast for LAC leads to the conclusion that: i) the moderate growth scenario is coherent with what IMF is expecting for Colombia, and ii) the growth impact of the crisis in 2009 was more severe in countries like Mexico, Chile, and Brazil, even though the growth recovery has been faster in these countries. The Colombian economic performance in these two years (2009-10), is just equal to the average (simple) for the region (Figure 5).

Figure 4



Source: Calculations of the author.

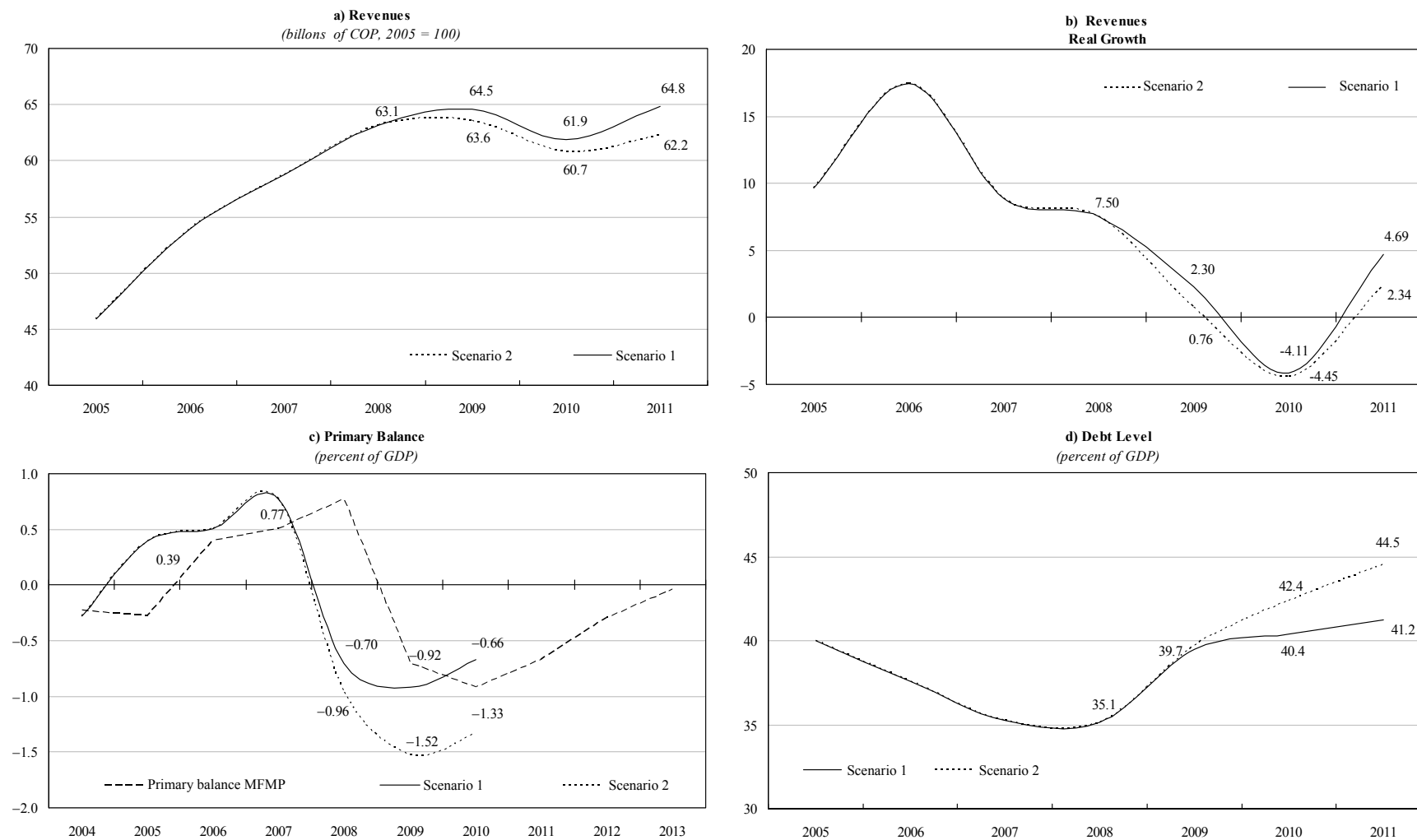
Figure 5



Source: WEO-IMF.

Figure 6

## Fiscal Effects of the Economic Slowdown



Source: Calculations of the author.

Under each economic growth scenario and considering other consistent macroeconomic assumptions, a predicting exercise of tax revenue, primary balance and debt, for the short and medium terms, was carried out.<sup>17</sup> Figure 6 illustrates how the economic slowdown will have negative effects on the central government finances. In both scenarios, government revenues will decline, in real terms, more than –4 per cent in 2010; the primary balance will be negative between 2009 and 2011 (higher than –1 per cent of GDP); and debt levels will reach those recorded at the beginning of the decade (above of 40 per cent of GDP), when the central government finances were highly fragile. With regards to the pre-crisis period (2007-08), the debt level could increase in 2011 about 8 percentage points of the GDP.

Although the main fiscal indicators are declining in Colombia as result of the global crisis, it is certainly not a “huge fiscal decline”, as has been the case of the majority of OECD economies. However, fiscal authorities are facing important policy challenges to guarantee the long-term sustainability of the public finances, and particularly to implement counter-cyclical tools that help face unexpected shocks like the 2008 crash. The defies are difficult and mounting since the Colombian government has been solving a larger demand for social expenditures, particularly in the social security services; the poverty level has increased in recent times (around of 45 per cent); and the political internal conflict still remains to be solved.

#### **4 Designing a fiscal rule to manage public finances**

According to preliminary exercises of prediction, the primary balance for central government will return to an equilibrium level (not positive) only since 2014. This means that only by then, the debt-to-GDP ratio would return to its downward trend.<sup>18</sup> Under these circumstances, it is not advisable for the government to assume a passive fiscal posture in the upcoming years. The unexpected increase in fiscal deficits and public debt has raised concerns about the sustainability of public finances in Colombia, and underlines the need for additional adjustments in the medium term.

As was mentioned in Section 3, Colombia has made significant progress towards fiscal consolidation over the last ten years. Nevertheless, the fiscal adjustments have not sufficed and, somehow, they have been partially reversed by the 2008 global financial crisis. The current scenario calls for the adoption of a fiscal rule (well-designed and well-implemented) on central government finances that would guide fiscal policy in medium and long terms and, particularly, anchor expectations regarding the sustainability of the public debt. The fiscal adjustments advanced to date constitute a credible prelude for the establishment of such a rule.

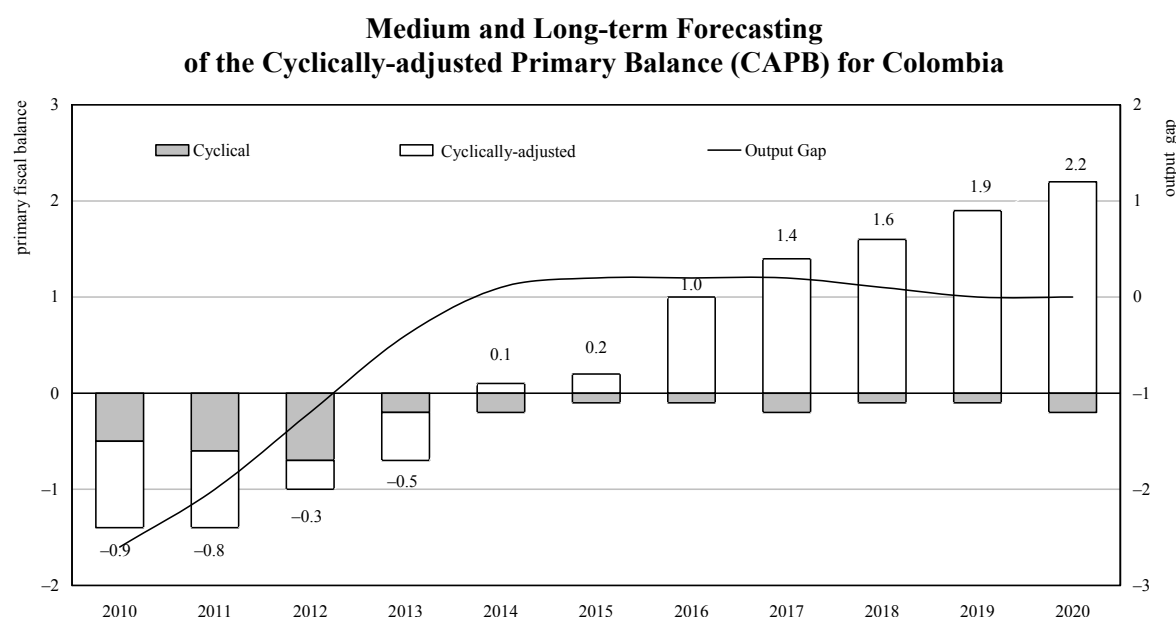
A recent IMF study states that in countries with no existing rule and relatively small adjustment needs (like Colombia), early implementation of a fiscal rule may help strengthen policy credibility. The confidence and credibility are essential to anchor long-term expectations about the sustainability of the public debt. Such anchoring, in turn, could help prevent adverse market reactions, including a higher risk premium, and facilitate the adoption of a prudent fiscal policy (IMF, 2009). It should be recalled that Colombia does not have investment grade, like Chile, Brazil, Mexico, and Peru, which means that its debt is relatively more expensive. In this regard, the fiscal rule might help the country regain the investment grade that was lost in the late nineties.

From a macroeconomic standpoint, there is evidence that fiscal rules enhance the credibility of government decisions; allow countries to have counter-cyclical and sustainable fiscal policies;

<sup>17</sup> The macroeconomic assumptions are derived from the balance of payments, and include inflation, exchange rate, external prices of major commodities, the import growth, and the economic growth of major trading partners.

<sup>18</sup> This is mainly due to the fact that output gap remains negative until 2013.

Figure 7



Source: Calculations of the author.

and contribute to economic stability and long-term economic growth.<sup>19</sup> The adoption of fiscal rules has become an institutional strategy for most OECD countries and for several LAC (Brazil, Chile, Mexico and Peru). Colombia began to introduce fiscal rules by the end of the nineties, but mainly at the sub-national level. In particular, the operational expenditures and the debt levels of the sub-national governments were constrained to the performance of their own revenues and to their payment capacity, respectively. Since then, local governments in Colombia have not been a source of fiscal disequilibrium.

Among several alternatives, the Colombian government is currently analyzing the cyclically-adjusted primary balance (CAPB) as one of the best indicators to fix the fiscal rule. The primary balance excludes the interest payments on the debt, over which the fiscal authority has no discretion. As such payments could be very sensitive to exogenous macroeconomic variables such as the exchange rate and the interest rates (domestic and external), may be appropriate that the rule would not depend on the volatility of these variables. Another advantage of focus on CAPB is that is relatively more controllable by the fiscal authorities. In addition, if the rule is adopted to guide fiscal policy towards the smoothing the economic fluctuations, the international evidence suggests that the CAPB becomes in one the best indicators since it allows the automatic stabilizers to operate fully.

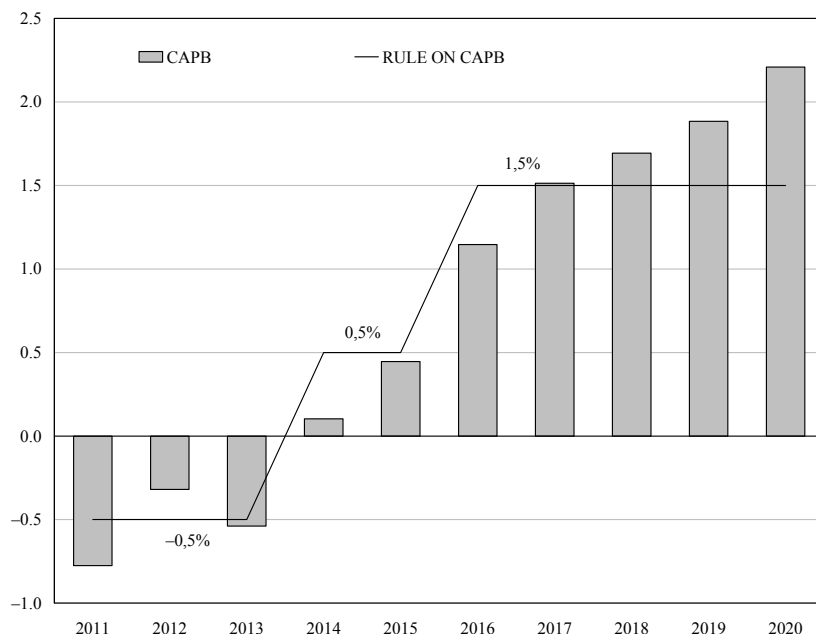
Figure 7 displays a CAPB long-term prediction exercise, to examine the adoption of a fiscal rule on this indicator. For the reasons stated above, the coverage of the new rule would apply only to the central government finances. The fiscal forecasting exercise is made on the basis of a conservative macro-scenario, which does not contemplate any additional tax reforms, and is also consistent with the reduced fiscal space. Remarkably, the negative output gap will close smoothly until 2013 (right scale). Moreover, the CAPB will be negative until 2013 (–0.6 per cent of the

<sup>19</sup> Kopits (2004) and Fatás and Mihov (2003).



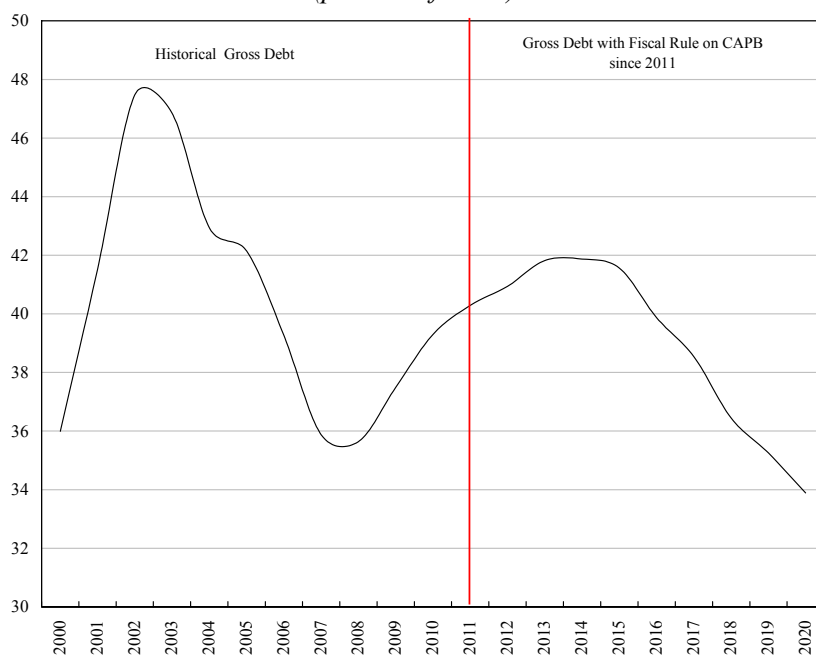
Figure 8

## Fiscal Rule on Cyclically-adjusted Primary Balance (CAPB)



Source: Calculations of the author.

Figure 9

Debt Forecasting with Fiscal Rule on CAPB  
(percent of GDP)

Source: Calculations of the author.

potential GDP, on average) and, thereafter, will remain almost in equilibrium for the following two years. Afterward, the CAPB will become positive (on average 1.6 per cent of the potential GDP between 2016 and 2020).

In conformity to these results, the fiscal rule must have at least three key elements to secure credibility, counter-cyclicality, and fiscal discipline in the long term; moreover, it should be supplemented by other fiscal reforms to render feasible its implementation. First, the CAPB rule must include more than one numerical target for the coming years, to make possible its fulfillment at the stage of economic recovery. Assuming that the fiscal rule would be adopted as of 2011, for instance, this paper proposes a numeral target in three steps:  $-0.5$  per cent of GDP for 2011, 2012 and 2013;  $+0.5$  per cent for 2014, and 2015; and finally,  $+1.5$  per cent, as of 2016. These goals must be reviewed at any prudential intervals (*i.e.*, every 5 years) to introduce any required adjustments.

Second, the numeral target on CAPB must guarantee a decreasing trend for the debt-to-GDP ratio of the central government, so that in the long term

(2020 and thereafter) it reaches levels close to (or below of) 30 per cent of GDP. Finally, any positive or negative divergence in output gap with respect to what is considered here, will allow the government to design a counter-cyclical fiscal policy, to absorb partially any external shocks, and to smooth the business cycle. For the case of unusual and unpredictable exogenous financial and real shocks, generated from external and domestic sources (terms of trade, sudden stops in capital inflows, natural catastrophes, wars, and so on), is recommended that the fiscal rule includes explicitly clauses of scope to these events. This study offers evidence for the first two elements in Figures 9 and 10.

## 5 Conclusions

The following points summarize some of the most important findings of this study:

- From the 1960s, discretionary fiscal policy in Colombia has been pro-cyclical; it has been coherent with the long-term condition of debt sustainability – although in a weak sense, particularly over the last two decades; and it has registered a decreasing volatility in recent years. These have been the three most relevant traits of fiscal policy, from a macroeconomic perspective.
- Pro-cyclicality was assessed both through a standard fiscal reaction function and through fiscal impulses. The results show that, on average, for each percentage point increase in the output gap, the structural balance deteriorates by about one sixth-part. Fiscal sustainability was also evaluated through cointegration models. These models offer evidence in favor of the expenditures-to-revenue long-term determination hypothesis, which means that the government spending has been determining the dynamics of its revenues. Between 1990 and 2008, on average, an increase of 1 per cent of the GDP in the primary spending was associated with an increase of 0.48 per cent of the GDP in tax revenues. In practical terms, this means that the fiscal stance was sustainable, but only in a weak sense.
- Throughout the pre-crisis period, public finances displayed a remarkable improvement in Colombia. Between 2002 and 2008, the fiscal balance of the central government went down from 5.3 to 2.3 per cent of the GDP, and its debt level decreased from 47.5 to 36 per cent of the GDP. These positive trends were fostered by fiscal reforms designed to increase revenues as well as to moderate the growth of the public expenditures. However, their most important causes were relative to favorable internal and external macroeconomic factors, including the boom of oil prices. The sharp economic slowdown that began in the fourth quarter of 2008 and extended into 2009 (the last four quarters have yield negative growth rates) caused a significant drop in tax revenues and the subsequent deterioration of the fiscal indicators.
- The deficit of the central government for 2009 rose from an initially expected level of 2.6 per cent of the GDP to a final level of 4 per cent (deterioration of 1.4 per cent). It is anticipated that the fiscal balance will continue to decline in 2010, by the lagged effect of the crisis. Because this larger fiscal deficit is mainly explained by the fall of endogenous revenue and the preservation of public expenditure rates, this discretionary fiscal stance can be typified as neutral or a-cyclical. It can be inferred that for each percentage point of lower economic growth, the fiscal deficit has been deteriorating by 0.3 per cent of the GDP (*i.e.*, 0.3 is the size of automatic stabilizer).
- An additional decline of the fiscal indicators in the medium term will depend on the severity of the economic downturn during 2009 and 2010, and mainly on the recovery path of subsequent years. As will be the case of other LAC, economic recovery in Colombia will be conditional to the revitalization of the global economy and, in particular, of the U.S. economy, and those of other important trading partners such as Venezuela, Ecuador, and the E.U. Using two

foreseeable scenarios for economic growth in Colombia, for the period 2009 to 2011, this analysis concludes that: the government revenues will decline, in real terms, more than –4 per cent in 2010; the primary balance will be negative between 2009 and 2011 (higher than –1 per cent of GDP); and the debt levels will reach those of the beginning of the decade (above 40 per cent of GDP). Comparing to the pre-crisis period (2007-08), in 2011, the debt level could increase by about 8 percentage points of the GDP.

- The unexpected increase of fiscal deficits and public debt, as a consequence of the global financial crisis, has raised concerns about the sustainability of public finances in Colombia. The short and medium term scenarios call for the adoption of a fiscal rule on central government finances that would guide fiscal policy in the future. The fiscal adjustments advanced to date constitute a credible prelude for the establishment of such a rule.
- The adoption of a fiscal rule may strengthen policy credibility. Confidence and credibility are essential to anchor long-term expectations about the sustainability of the public debt. This, in turn, could help prevent adverse market reactions, including a higher risk premium, and facilitate the adoption of a prudent fiscal policy. It should be recalled that Colombia does not have an investment grade, like Chile, Brazil, Mexico, and Peru, and that the fiscal rule might help the country regain the investment grade that was lost in the late nineties.
- The Colombian government is currently analyzing the cyclically-adjusted primary balance (CAPB) as one of the best indicators to fix the fiscal rule. After a CAPB long-term prediction exercise, this analysis suggests that the fiscal rule must have at least three key elements to secure credibility, counter-cyclicality, and fiscal discipline in the long term. First, the rule must include more than one numerical target for the coming years. Assuming that the rule would be adopted as of 2011, the numeral target must contain three levels: –0.5 per cent of GDP for 2011, 2012, and 2013; +0.5 per cent for 2014, and 2015; and +1.5 per cent as of 2016. These goals must be reviewed at any prudential intervals (*i.e.*, every 5 years) to introduce any required adjustments.
- Second, the targets on the CAPB must guarantee a decreasing trend for the debt-to-GDP ratio of the central government, so that in the long term (2020 and thereafter), it reaches levels below of 30 per cent of the GDP. Finally, any positive or negative divergence in output gap, with respect to what is considered here, will allow the government to design a counter-cyclical fiscal policy to absorb any external shocks, and to smooth the business cycle. This study offers evidence of these considerations.

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# FISCAL INSTITUTIONS IN NEW ZEALAND AND THE QUESTION OF A SPENDING CAP

*Tracy Mears,\* Gary Blick,\* Tim Hampton\* and John Janssen\**

*New Zealand's current fiscal policy framework has been in place for nearly 20 years. At its core is a set of principles around maintaining prudent levels of public debt and running fiscal surpluses on average over time. This framework, combined with an extended period of economic growth, contributed to New Zealand entering the global financial crisis with historically and internationally low levels of public debt.*

*While the current fiscal policy framework has helped achieve and maintain defined, prudent levels of public debt, it does not require the government to define a target level for government spending. Over recent years, government spending has increased as a share of GDP. Most of this reflects increased spending during the extended economic upturn through the middle of last decade. The recent recession has also played a small role in increasing spending, largely through the automatic stabilisers as New Zealand did not implement a substantive expenditure-based stimulus package. The Government therefore committed to investigating whether a spending cap would be an appropriate addition to the existing fiscal policy framework. This paper outlines the motivation for such a spending cap, presents a proposed design, including some of the potential challenges, drawing heavily on international experience.*

*Reflecting on this analysis, the Government decided not to introduce a formal cap on total spending in Budget 2010. The benefits of the proposed spending cap are that it would have reinforced the commitment to the existing limit on new initiatives (via the \$1.1 billion Operating Allowance) and placed an indicative limit on other forecasted expenses increases that go through the Baseline Update process. However, the complexity of the proposal may have led to significant communication challenges and some confusion about how it would operate alongside the existing system.*

## 1 Introduction

New Zealand's current fiscal policy framework has been in place for nearly 20 years. At its core is a set of principles around maintaining prudent levels of public debt and running on average over time fiscal surpluses. This framework, combined with an extended period of economic growth, contributed to New Zealand entering the global financial crisis with historically and internationally low levels of public debt.

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The views, opinions, findings, and conclusions or recommendations expressed in this paper are strictly those of the authors. They do not necessarily reflect the views of the New Zealand Treasury.

While the current fiscal policy framework has helped achieve and maintain defined, prudent levels of public debt, it does not require the government to define a target level for government spending. Over recent years, government spending has increased as a share of GDP. Most of this reflects increased spending during the extended economic upturn through the middle of last decade. The recent recession has also played a small role in increasing spending, largely through the automatic stabilisers as New Zealand did not implement a substantive expenditure-based stimulus package. The Government therefore committed to investigating whether a spending cap would be an appropriate addition to the existing fiscal policy framework.

Section 2 considers the literature on fiscal rules, how they have been used internationally and how they have performed over the past few years. One thing that is apparent is that the appropriate design for a spending rule is dependent on the existing fiscal arrangements. Therefore, Section 3 outlines New Zealand's current fiscal institutions and Section 4 describes the evolution of Budget management processes. Section 5 provides some more context by outlining New Zealand's economic and fiscal performance over the past decade. Section 6 outlines some of the key design choices that would be relevant if a spending cap was to be introduced in New Zealand. Section 7 then discusses some of the Government's reasoning for not going ahead with a cap on total spending at this point in time.

## **2 Fiscal rules – theory and international experience**

### *2.1 Definitions and objectives of fiscal rules*

Fiscal rules are a subset of fiscal institutions – the arrangements that form a nation's public finance framework. Institutions include the legislative framework for budgeting and fiscal planning, any policy guidelines or well-established norms, the public institutions involved in the planning and implementation of the budget process, and any independent entities that give advice or monitor performance.

Kopits and Symansky (1998) define a fiscal rule as “a permanent constraint on fiscal policy through simple numerical limits on budgetary aggregates”. Although the legal form can vary – international treaty, constitutional amendment, legal provision, or policy guideline – a common theme, as the International Monetary Fund (IMF, 2009) has noted, is that fiscal rules are all mechanisms aimed at supporting fiscal credibility and discipline. Ongoing debate over the relative merits of rules versus the merits of other institutions, such as a fiscal policy committee or a fiscal advisory council, is outside the scope of this paper.<sup>1</sup>

Fiscal rules can have various objectives, such as promoting debt sustainability, promoting macroeconomic stabilisation, containing the size of government, or supporting intergenerational equity. The key objective is usually the promotion of fiscal sustainability. The IMF (2009) has compiled a dataset of fiscal rules applied to central government in member countries, and characterised the rules into the following groupings:

- budget balance rules – including rules that relate to the overall balance, the structural or cyclically-adjusted balance, or the balance over the cycle, with the aim of restraining the build-up of debt-to-GDP ratios;
- debt rules – such as a limit or target for public debt as a share of GDP;
- expenditure rules – also known as spending rules, may involve limits on total, primary or current spending, either in absolute terms, growth rates or as a share of GDP; and

<sup>1</sup> Wyplosz (2005), for example, argues that rules are often too flexible or too stringent, and that adequate incentives backed by institutions are the better option.



- revenue rules – may be ceilings to prevent an excessive tax burden, or floors aimed to boost revenue.

## 2.2 *Prevalence of fiscal rules*

Fiscal rules have become more prevalent among countries over the past two decades. The IMF (2009) has documented a rise in the use of fiscal rules; in 1990, only seven countries had national or supranational fiscal rules applying to central government, whereas by 2009 this had increased to 80 countries. This increased attention to fiscal rules was, at least in part, a reaction to a build-up of public debt in many countries through the 1970s and 1980s.

In recent years, spending rules (a subset of fiscal rules) have become more widespread, reflecting a trend for countries to move from a single rule (such as a debt or a balanced budget rule) to multiple rules. The choices and tradeoffs involved in a wider set of rules are discussed by Anderson and Minarik (2006) and Kumar and Ter-Minassian (2007). In 2009, 25 countries were making use of spending rules in some form – whereas only ten countries had been using a spending rule in 1999 (IMF, 2009). The increased prevalence of spending rules, in particular, reflects the fact that a debt target or balanced budget rule, on its own, places little discipline on the growth in government spending in the times of strong revenue growth during an economic expansion (Barker and Philip, 2007).

## 2.3 *Design features*

The IMF has suggested that there are three components of effective fiscal policy rules:

- 1) an unambiguous and stable link between the numerical target and the fiscal objective;
- 2) sufficient flexibility to respond to shocks, so that a rule should at least not exacerbate the macroeconomic impact of a shock; and
- 3) a clear institutional mechanism to map deviations from the rule into incentives to take corrective actions (e.g., by raising the cost of deviations, or mandating the correction of a deviation).

The legal form of fiscal rules may vary. With regard to spending rules, although in some (predominantly developing) countries these are embedded in national legislation, the IMF (2009) has found this is not necessarily a requirement for a rule to endure. Ljungman (2009) examines spending rules in three countries – Finland, the Netherlands and Sweden – and found that each has the status of a political commitment with no predefined sanctions in the event of a breach, other than reputational costs for the Government. Ljungman concludes that any spending rule that is not perceived as serving the interest of the Government and Parliament will inevitably be circumvented, and that “in the absence of this widespread political support, it is doubtful that the legislative status of a spending rule will have any impact on actual policy formulation”.

## 2.4 *Effectiveness of fiscal rules*

Research into the effectiveness of fiscal rules is ongoing, but in reviewing available empirical studies, the IMF recently concluded that fiscal rules have generally been associated with improved fiscal performance (IMF, 2009). In addition, Badinger (2009) has found tentative evidence across a sample of OECD countries that the fiscal rules introduced since 1990 reduced the extent to which governments have made use of discretionary fiscal policy, although no New Zealand-specific results are reported. Intuitively, the effectiveness of a rule depends on the

institutional context into which the fiscal rule is being applied and the existing macroeconomic environment, as well as the design of the rule itself.

In terms of spending rules, countries such as Finland, the Netherlands and Sweden appear to have had positive experiences. Ljungman concluded that the general impression in each of those countries has been that a spending rule has contributed to maintaining stable public finances. However, as Ljungman notes, an unambiguous correlation between the spending rules and the robustness of public finances is difficult to establish, particularly since economic growth had been relatively strong in the period between their introduction in the mid-1990s and the time of his review in 2008. In addition, Finland and the Netherlands are part of the euro area, so it is plausible that improvements in the conduct of their fiscal policy have been influenced by requirements of the Stability and Growth Pact associated with that monetary union.

The global financial crisis in 2008-09 and the associated macroeconomic shocks have posed challenges for fiscal institutions in many countries. There are signs that even countries with established spending rules have substantially increased spending in an environment with lower-than-expected economic growth and decisions to implement fiscal stimulus packages. For example, the OECD's *Economic Outlook* from May 2010 forecasted general government spending as a share of GDP to have increased between 2007 and 2011 in Finland (+8.2 percentage points), the Netherlands (+6.4 percentage points) and Sweden (+2.8 percentage points).<sup>2</sup> It will be interesting to see how countries with spending rules fare in managing spending growth over the next few years.

### 3 New Zealand's legislative framework<sup>3</sup>

Reflecting a combination of external factors and policy choices, New Zealand's fiscal position deteriorated considerably from the mid 1970s until the early 1990s, with net public debt rising from around 5 per cent of GDP in 1974 to above 50 per cent of GDP in 1992. In response, the Government adopted a number of practices that aimed to improve fiscal management, with a large emphasis on transparency. The Fiscal Responsibility Act (FRA) of 1994 codified the initial practices, including the shift to accrual accounting, the publication of short-term fiscal forecasts and the publication of a pre-election economic and fiscal update.

The FRA aimed to address the earlier poor fiscal performance by:

- strengthening the incentives on Ministers to set Budget priorities and to follow an agreed fiscal strategy; and
- providing more regular information to the public on the medium-term fiscal outlook and the decisions that underpinned that outlook.

In 2005, the FRA was incorporated into the Public Finance Act (PFA) of 1989. The fundamental principles of responsible fiscal management contained in the 1994 Act were retained (see below). The intention of the merger was to consolidate legislation regarding public finance and it also provided the opportunity to make some amendments to the FRA.

The amendments were introduced to align New Zealand's fiscal reporting with best international practice after assessing legislation in the United Kingdom and Australia, reviewing the best practice guidelines issued by the IMF and OECD and drawing on experience with the legislation since its introduction. The key addition was a legislated requirement for the Treasury to

<sup>2</sup> The comparable figure for New Zealand is +4.4 percentage points.

<sup>3</sup> The section draws on New Zealand Treasury (2005). Scott (1996) and Janssen (2001) discuss the development of the Fiscal Responsibility Act and its relationship to wider public sector reform such as the State-owned Enterprises Act 1986, the State Sector Act 1988 and the Public Finance Act 1989.

produce a regular statement on the long-term fiscal position covering at least 40 years (New Zealand Treasury, 2009).

The PFA sets out five principles of responsible fiscal management. The two that are most relevant for this paper are those associated with debt and fiscal balance:<sup>4</sup>

- Reducing total debt to prudent levels, so as to provide a buffer against factors that may impact adversely on the level of total debt in the future. Until prudent levels of debt have been achieved, the Government must ensure that total operating expenses in each financial year are less than total operating revenues in the same financial year.
- Once prudent levels of total debt have been achieved, maintaining those levels by ensuring that, on average, over a reasonable period of time, total operating expenses do not exceed total operating revenues.

Definitions such as “prudent” level of debt or “reasonable period of time” are not specified in the PFA. It is left to the Government of the day to interpret the relevant fiscal terms. Importantly, although a Government can depart from the principles, the PFA requires any such departure to be temporary and that the Minister of Finance specify the reasons for departure, the approach to be taken to return to the principles and the period of time that this is expected to take.

In addition, the PFA requires the Government to annually state long-term (ten or more years) fiscal objectives and short-term (three year) fiscal intentions for the following variables:<sup>5</sup>

- total operating expenses;
- total operating revenues;
- the balance between total operating expenses and total operating revenues;
- the level of total debt; and
- the level of total net worth.

With the exception of the principles of responsible fiscal management that relate to debt and the operating balance, the PFA is not prescriptive about what the fiscal objectives and fiscal intentions should be. Rather, it requires the Government to state its objectives and intentions, whether they have changed and how they accord with responsible fiscal management. This means that a trend increase in government expenses as a share of GDP is permissible under the PFA provided that the principles relating to debt, the operating balance, and revenue are adhered to.

## 4 New Zealand’s budget management process

As with the legislative framework, the Budget management process has evolved over the past 20 years. This evolution can be split into three distinct phases: fixed nominal baselines; fiscal provisions; and the Fiscal Management Approach.<sup>6</sup>

### 4.1 Fixed nominal baselines

Prior to the introduction of the PFA in 1989, the Budget process involved making regular

<sup>4</sup> The others relate to net worth, fiscal risks, and the predictability and stability of tax rates.

<sup>5</sup> The reporting requirements in the PFA relate to a definition of “total” government that includes the Core Crown, Crown entities, and State-owned Enterprises (SOEs). Given the central role of the budget, fiscal policy has focused on the Core Crown and Crown entities.

<sup>6</sup> More detail and evaluation is provided in Barnes and Leith (2001); OECD (2002); the New Zealand Treasury (2003); and Wilkinson (2004).

adjustments to personnel costs based on public sector wage negotiations. Operating and capital spending were generally adjusted annually to reflect expected cost movements. Government Budgets were made only for the year ahead with no forecasts of spending in subsequent years.

The early 1990s saw a shift to fixed nominal baselines, where the “baseline” is the agreed Budget allocation over the forecast period. Government spending was split into “formula-driven” and “fixed” (*i.e.*, no change to nominal baseline amounts). Formula-driven indexation applied to non-departmental spending on benefits (e.g., inflation indexation of unemployment payments, wage indexation of public pensions) and volume adjustments. A specific policy decision was required to change non-indexed spending. A key issue to emerge was the effect of fixed nominal baselines on the short-term fiscal forecasts. For example, three-year fiscal forecasts between 1994 and 1996 included increases in government spending only for those areas affected by indexation. With all other spending assumed to remain constant over time, this yielded a profile of rising forecast surpluses. Together with concerns about agencies’ abilities to meet rising costs this created pressure to increase nominal baselines.

#### 4.2 *Fiscal provisions*

In its 1997 Budget, the Government adopted a \$5 billion (cumulative) cap on new spending over the three fiscal years 1998 to 2000. This cap was on top of expenses already included in the fiscal forecasts (*i.e.*, on top of the fixed nominal baselines and formula-driven indexed items). The cap evolved into a mechanism known as the fiscal provisions, which also included a set of rules for identifying which items would be treated as specific policy decisions and therefore “counted” towards the cap on spending. Formula-driven increases in expenses that did not “count” would still be permitted but did not impact on the amount available for new initiatives. For example, an increase in unemployment benefit payments due to higher unemployment would not be financed by (or “count against”) the fiscal provisions.

A capital provision, linked to the debt objective, sat alongside the operating provisions. The capital provision generally provides for new investments or where maintaining current operations cannot be funded from accumulated depreciation on balance sheets.

#### 4.3 *Fiscal management approach*

In Budget 2002, the Government signalled a change to the fiscal provisions framework that:

- shifted the focus to the paths of the operating balance and debt rather than just the nominal new spending amount; and
- sought to ensure that spending intentions remained relevant as the economic and fiscal outlook evolved. Spending plans would be reviewed twice yearly with reference to updated forecasts and progress against fiscal objectives.

These new procedures were termed the Fiscal Management Approach (FMA), with the amounts for new initiatives being relabelled as the Operating Allowance (for expense and revenue initiatives) and the Capital Allowance (for capital initiatives). This is the system that remains in place today.

Under the FMA there are three ways that the levels of expenses, revenue and capital items can change.

The first is changes in the profile of the expected values of expenses, revenue and capital resulting from current policy settings (referred to as the “profile”). For expenses, these changes will generally result from existing demand-driven programmes. For example, the current forecasts will

build in an expectation of the rising cost of New Zealand Superannuation (NZS) as more people reach retirement age. In Budget 2010 the forecasted cost of NZS in 2010 is \$8.287 billion and in 2011 is \$8.822 billion and in 2014 is \$10.781 billion. This expected rising profile is built into the expense forecasts.

The second way in which expenses, revenue and capital can change is via the addition of new discretionary initiatives which are included as part of the Operating Allowance (for revenue and expenses) and the Capital Allowance. These are referred to as “new discretionary initiatives”. The focus of Budgets has tended to be on allocating those allowances to the Government’s priority initiatives. The allowances are set with a view to achieving the Government’s medium-term operating balance and debt objectives. So, if the Government decided to increase the rate at which NZS is paid or change the eligibility criteria which increased uptake, those discretionary policy decisions would be counted against the Operating Allowance in the year the decision was made. New discretionary initiatives are then incorporated into the base or the profile of forecasted spending for future years.

The third way in which expenses can change is when there are revisions to the forecasted expenses of existing programmes which are seen to be outside the direct control of government because they are demand, volume or index driven (these are referred to as “changes in forecasted costs”). For example, if there are revisions to the estimate of the population of aged 65 and over or revisions to the forecast wage track (as NZS payments are supported by a wage floor) the expected cost of NZS would increase. The forecasted cost of NZS for 2009-10 increased from an estimate of \$8.246 billion in Budget 2009 to an estimate of \$8.287 billion in Budget 2010.

These changes in forecasted costs are incorporated automatically through the Baseline Update process. This occurs twice a year as part of the updating of the fiscal estimates during the forecast round. Many of the non-welfare related Baseline Updates were originally envisaged as “counting” against the Operating Allowance. Overtime this practice has changed, and some spending increases have not been counted against the Allowance, e.g., the increased costs of KiwiSaver, a subsidised saving scheme, due to higher than forecast uptake. The Baseline Update process also incorporates other changes to baselines, such as those due to policy decisions (e.g., a decision to bring forward forecast expenditure) or valuation changes relating to impairments (mainly of student loans and tax receivables, and reflecting changes in future collectability of these assets).

This separation between demand-driven items that are automatically incorporated into the forecasts via the Baseline Update process and discretionary initiatives that count against the fixed Operating and Capital Allowances puts some pressure on the boundary between the two categories. The FMA specifies a set of rules as to what types of new initiatives must be agreed to within and outside the Operating and Capital Allowances. In addition, the government is ultimately responsible for setting the allowances in each Budget so as to achieve its fiscal objectives.

In setting the Operating and Capital allowances under the FMA, information on the macro-economy is also considered. The weight put on macro-stability issues (“macro headroom”) relative to sustainability issues (“fiscal headroom”) has varied through time depending on the stage of the cycle.

## **5 New Zealand’s economic and fiscal performance over the past decade**

### *5.1 The 1998 to 2007 economic expansion*

Between the September quarter 1998 and the December quarter 2007, New Zealand experienced its longest period of economic expansion since 1945. Although the expansion was not as long as those experienced in countries such as Australia and the United Kingdom, the length

of the expansion still made it difficult to establish at the time how much of the increase in economic activity was sustainable and how much was cyclical. Figure 1 presents the estimated output gap for that period, from the perspective of 2010.

A lot of that growth was based on fundamentals, such as population growth, a strong global economy and rising terms of trade. However, as the expansion continued, there was increasing concern about the build-up of imbalances, reflected in excess credit growth, increased net foreign liabilities and high non-tradable inflation.

Throughout this period, the Government's fiscal strategy was to strengthen the fiscal position, both through debt repayment to achieve the debt objective and through accumulating financial assets in the New Zealand Superannuation Fund (NZSF). The Government established the NZSF in 2001 as a means to prefund out of current tax revenue some of the projected increase in fiscal costs associated with the ageing population (e.g., public pensions). This meant running successive operating surpluses –

Figure 1

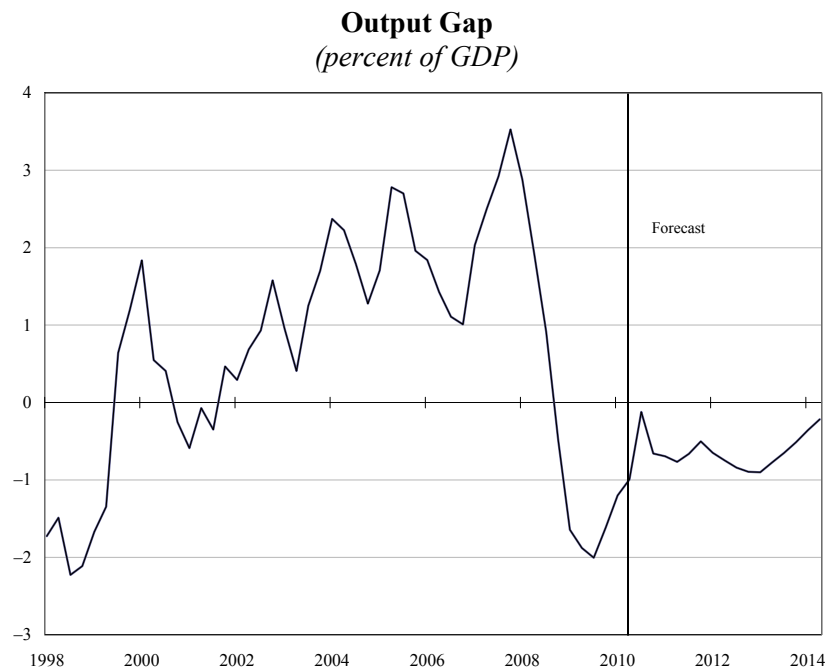
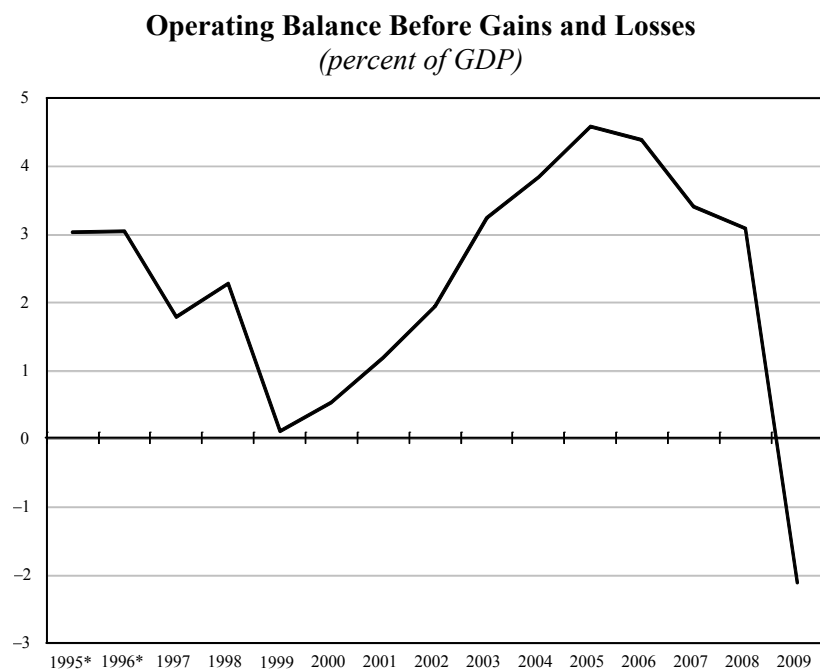
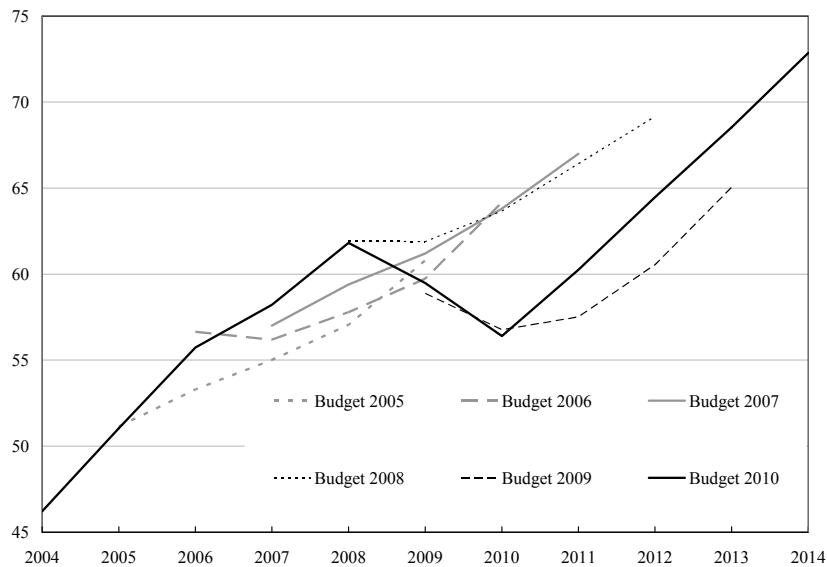


Figure 2



**Figure 3**

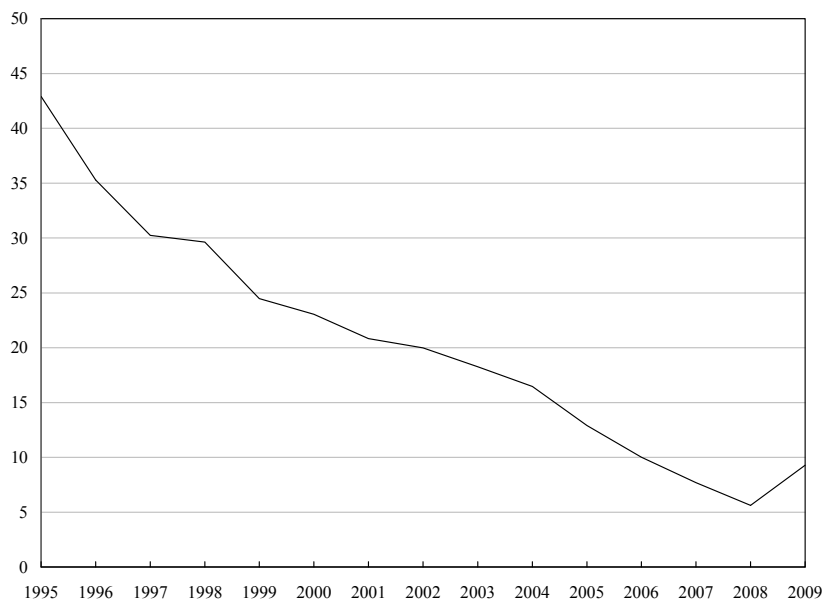
**Core Crown Revenue Forecasts**  
(billion dollars)



Source: New Zealand Treasury.

**Figure 4**

**Core Crown Net Debt**  
(percent of GDP)



Note: Net debt excludes the NZS Fund and advances.  
Source: New Zealand Treasury.

something that occurred up until 2008-09, as Figure 2 shows. This approach was in lieu of relying solely on increased future debt levels and future tax revenue or decisions to alter the public pension liability by changing eligibility or entitlements.

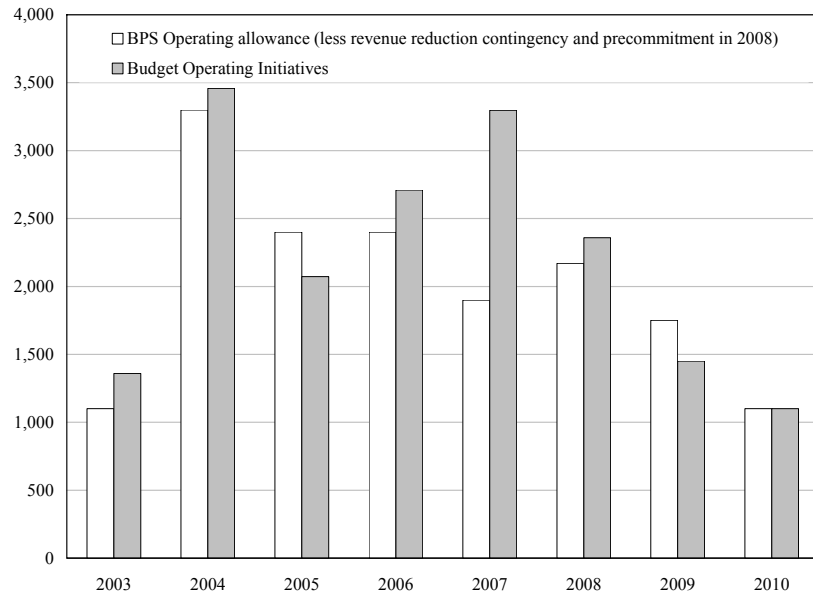
In the early 2000s, the fiscal strategy was achieved by relatively tight fiscal discipline. By the mid-2000s, the extended period of strong economic activity meant that the Government was presented with a series of upward revisions to its revenue forecasts (see Figure 3). For example, actual revenue for the 2008 financial year was about \$2.5 billion higher than the forecast figure produced at Budget 2007. These revenue surprises saw the fiscal position strengthen faster than planned.

The Government's response to the stronger-than-expected revenues included faster debt repayment (see Figure 4) and an associated downward revision of its long-term debt objective, and increasing government spending. In addition, the corporate tax rate was reduced in 2007 and personal tax rates were reduced in 2008 with a reduction to the top threshold rate in 2009.

The process for increasing spending and reducing taxes was primarily by increasing the Operating and Capital Allowances. When the Budget management process was changed to the FMA, the allowances were expected to be medium-term concepts that were set with a view to achieving the Government's medium-term operating balance and debt objectives. They were not expected to be revised frequently. However, in practice, the Government tended to use the positive revenue surprises and lower-than-expected levels of other expenses (see Barker, Buckle and St Clair, 2008) to increase the size of the Operating Allowance. Thus, the Operating Allowance tended to be revised (usually upwards) twice yearly when the economic and fiscal forecasts were done. Figure 5 shows the *expense* component of the Operating Allowance and its final forecast year impact, as stated in the *Budget Policy Statement* (typically released in December) and the Budget (typically released in May). In most years, the level of new expenditure was revised upwards between the *Budget Policy Statement* and the Budget, with the revision at Budget 2007 being the largest.

Figure 5

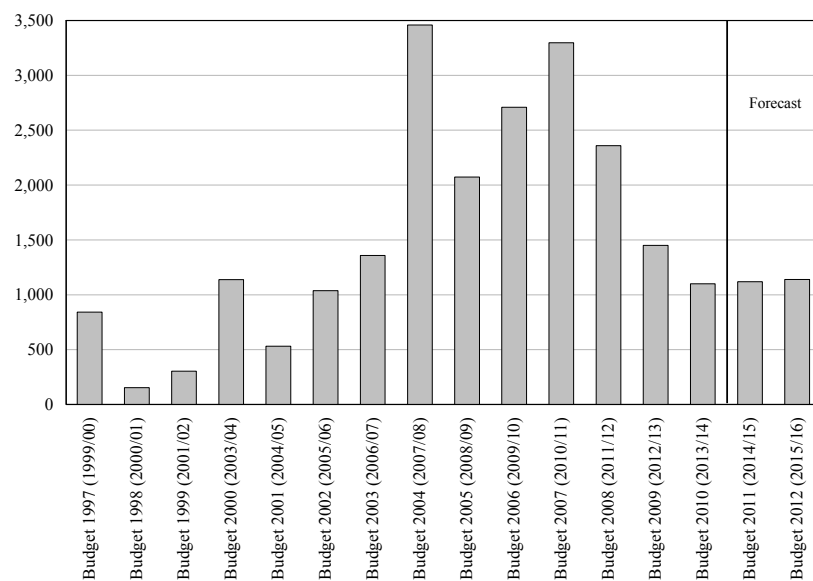
### Stated Allowance Versus Budget Operating Initiatives, 2003-10 (million dollars)



Source: New Zealand Treasury, *Budget 2010*.

Figure 6

### Operating Allowances: Final Forecast Year Impact of Budget on Operating Expenses (million dollars)



Note: These amounts are GST (Goods and Services Tax) exclusive. The year in each bracket is the final forecast year associated with that Budget. The three-year forecast horizon was extended to four years in Budget 2000.

Source: New Zealand Treasury.



Figure 6 plots the final forecast year impact of the annual Budget increment of new operating expenses created by the fiscal provisions and operating allowances<sup>7</sup>. This shows the effectiveness of the fiscal provisions in limiting new operating initiatives during 1998-2000 and the increase in new operating initiatives that has occurred from the mid-2000s.

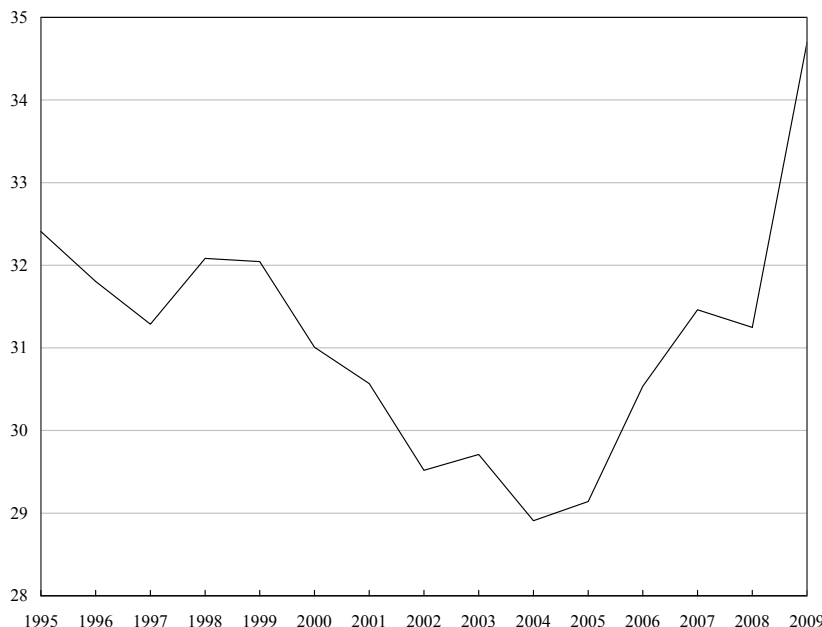
Government spending increased considerably as a share of GDP from the mid-2000s onwards. As Figure 7 shows, Core Crown expenses increased from 28.9 per cent of nominal GDP in 2003-04 to 34.7 per cent in 2008-09 – an increase of 5.8 percentage points over five years. Over half of this increase (3.5 percentage points) occurred as a single jump in the year to 2008-09. The economic cycle played a contributing role, for example, the 2008-09 recession led to higher unemployment expenses and slower growth in nominal GDP. Adjusting for these impacts of the cycle accounts for one percentage point, or 17 per cent, of the increase in expenses as a share of GDP.

Decisions to increase spending were the dominant driver of expenses rising as a share of nominal GDP. Average annual growth in Core Crown expenses of 8.9 per cent outstripped average annual growth in GDP of 4.9 per cent between 2003-04 and 2008-09.

Much of this increase reflected Budget decisions to direct new discretionary resources to expand existing services (e.g., health care, education and justice) and to increase transfers in the form of income subsidies for low and middle income working families, interest-free student loans and a subsidised saving scheme (KiwiSaver).

**Figure 7**

**Core Crown Expenses**  
(percent of GDP)



Source: New Zealand Treasury.

But a considerable share of the growth in Core Crown expenses over this period – around 40 per cent – occurred as a result of both the changing profile of costs over time and the changes in forecasted costs. For example, the actual cost of NZS grew by \$190-\$540 million per annum. For existing programmes like NZS it is not straightforward to distinguish between the changes due to the rising profile and the forecast changes in the historic data. For newer initiatives like KiwiSaver, it is possible to identify the changes to forecasted costs because the initial forecasts were counted against Operating Allowance in the year in which

<sup>7</sup> The chart focuses on the final year impact as the profile across the forecast horizon varies.

it was introduced. KiwiSaver subsidies in 2008-09 were \$1.28 billion, or 49 per cent higher than the \$860 million forecast at Budget 2007.

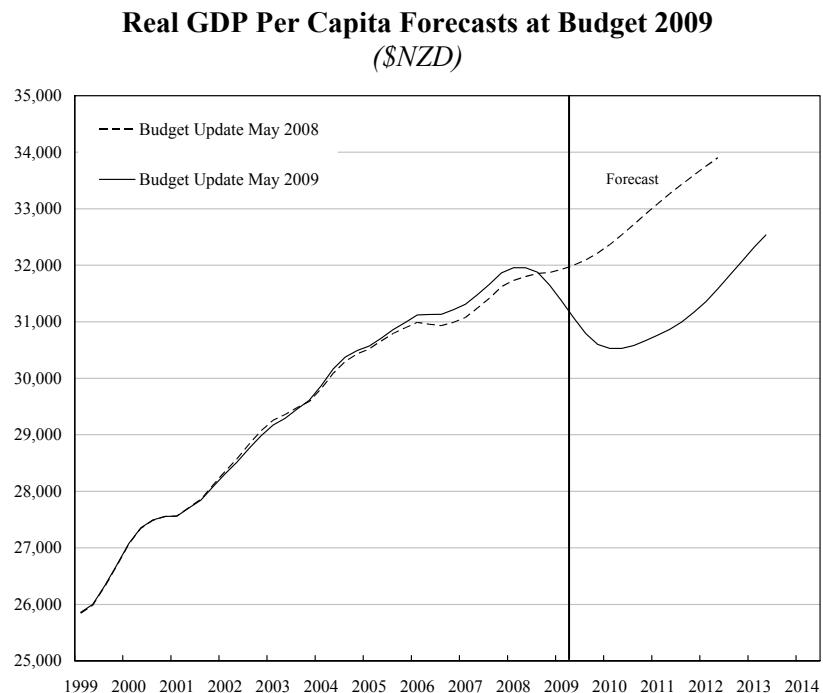
As will be discussed below, it is these sorts of changes to forecasted costs that could have been subject to an indicative limit and the associated trade-offs of a spending cap.

## 5.2 The 2008-09 recession and the global financial crisis

Although the New Zealand economy has performed much better than many other developed economies during the global financial crisis, it still contracted 3.4 per cent in real terms from the beginning of 2008 to the middle of 2009. As well as bringing the earlier expansion to an abrupt end, it prompted most forecasters to significantly revise down their projections for trend economic activity going forward – including the Treasury, as Figure 8 shows.

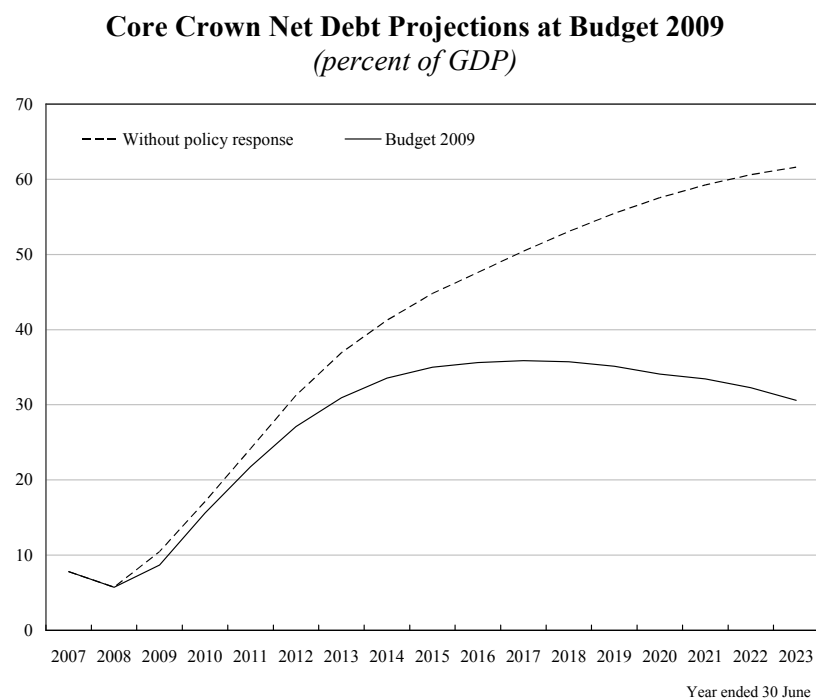
Therefore, not only did the fiscal position deteriorate as revenues declined through the recession and as a result of the tax cuts, but structural deficits emerged because some

**Figure 8**



Source: New Zealand Treasury.

**Figure 9**



Source: New Zealand Treasury (2009), *Fiscal Strategy Report*.

of the previous fiscal expansion was premised on the earlier – but ultimately overly optimistic – view of trend economic activity. As a result, net debt was projected to rise faster and further than previously projected.

Whatever the cause of the structural deficits, it was apparent at the time of Budget 2009 that a significant period of fiscal restraint was going to be required to return the forecast fiscal accounts to a sustainable position (see Figure 9). Budget 2009 included the postponement of scheduled personal tax cuts, a temporary suspension of contributions to the NZSF and a downward revision of future Operating Allowances.

### 5.3 Overall assessment of the past decade

Over the past decade New Zealand's fiscal position has strengthened considerably as a result of a combination of fiscal consolidation, improved institutional arrangements that had been established earlier, and improved economic performance.

In particular, the debt objective has been a key fiscal anchor that has helped communicate the Government's fiscal strategy and acted as a Budget management tool. By 2006, net debt had returned to below 10 per cent of GDP, where it remained until the advent of the global financial crisis. However, the fiscal framework did not constrain expenditure growth during a period of sustained economic expansion. Although a trend increase in government expenses as a share of GDP is permissible under the PFA, self-imposed expenditure objectives were either not achieved or revised upward, and there was insufficient attention paid to the base of spending – both its level and composition.<sup>8</sup> These broad conclusions are reflected in a number of papers assessing New Zealand's fiscal framework (see Janssen, 2001; OECD, 2002; Wilkinson, 2004; and Buiter, 2006).

The macroeconomic stabilisation role of the FMA, particularly in an environment of revenue surprises, and the potential role of alternatives is considered by Barker and Philip (2007). Barker and Philip conclude that the challenges of identifying and adjusting to permanent changes in the fiscal outlook are likely to have remained under any alternative Budget management approach.

In its 2008 *Briefing to the Incoming Minister* the Treasury wrote: "Given your priority around disciplining government spending we think there would be merit in adopting an additional fiscal anchor in the form of a medium term expenditure or revenue constraint (e.g., as a share of GDP)". The benefits to the Government of adopting such an anchor were seen as:

- signalling an intent to restrain the growth in spending and commitment to particular revenue levels to better manage expectations over the next three years and beyond;
- potentially increasing the contribution of fiscal policy to macroeconomic stability by providing more certainty and better supporting monetary policy over the longer term; and
- assisting the government to achieve a slowing in expenditure growth from current rates over the longer term to manage future spending pressures.

Similarly, the OECD also recommended consideration of a spending cap for New Zealand (OECD, 2009).

This focus was reinforced by the Minister of Finance, who stated in the 2009 *Fiscal Strategy Report* and the 2010 *Budget Policy Statement* that the Government was investigating a spending cap as a way of strengthening its fiscal strategy. The next section outlines some of the key design choices that the Treasury considered when preparing advice on whether or not a spending cap would be appropriate for New Zealand.

<sup>8</sup> Figure 26 in OECD (2002) illustrates the inconsistency between stated expense objectives and outcomes.

Table 1

**Changes in Core Crown Operating Expenses**  
(billion dollars, June years)

Item	2011	2012	2013	2014
<b>Core Crown expenses (year ended 30 June 2010)</b>	<b>64.791</b>	<b>64.791</b>	<b>64.791</b>	<b>64.791</b>
Impact of Budget 2010 decisions	1.212	1.124	1.101	1.100
Forecast new spending for Budget 2011	-	1.122	1.122	1.122
Forecast new spending for Budget 2012	-	-	1.146	1.146
Forecast new spending for Budget 2013	-	-	-	1.167
Contingency for weathertight homes	-	0.060	0.195	0.395
Impact of tax package on expenses	0.179	0.104	0.080	0.096
New Zealand Superannuation payments <sup>(1)</sup>	0.493	1.053	1.455	1.897
Other benefit payments <sup>(1)</sup>	0.506	0.592	0.902	1.087
Emissions Trading Scheme	0.907	0.275	0.581	0.727
Finance costs	0.866	1.469	1.959	2.181
Other changes	1.697	0.874	0.892	1.340
Total changes	5.860	6.673	9.433	12.258
<b>Core Crown Expenses</b>	<b>70.651</b>	<b>71.464</b>	<b>74.224</b>	<b>77.049</b>

<sup>(1)</sup> Excludes the impact from the tax package.

## 6 Designing a spending cap for New Zealand

### 6.1 Objectives of the cap

The main objective of the proposed spending cap was to help the Government deliver on its fiscal strategy. The fiscal strategy is focused on achieving the debt objective by managing the operating balance and capital spending. For a given revenue track, the way to manage the operating balance is to control government spending. For example, the Budget 2010 fiscal strategy projects a reduction in core Crown expenses from a peak of 34.7 per cent of GDP in 2011 to 28.4 per cent by 2024 – the final year of the projection period.

There are several ways in which a spending cap could potentially achieve that fiscal control:

- Increase transparency around the total level of spending (in 2010-11 around \$70 billion), with more focus on baselines and less on the new discretionary initiatives (the \$1.1 billion Operating Allowances). The cap would have been (in theory) a simple number against which the public could assess the actual level of government spending.
- Provide some built-in inertia in response to revenue surprises. Any upside revenue surprise would not immediately translate into higher spending, although it could have been factored in when resetting the cap.
- Improve fiscal management by putting a cap on total spending not just on discretionary new initiatives. The expenses that currently go through the Baseline Update process are subject to a lower degree of scrutiny than those expenses that count against the Operating Allowance as they are seen as outside the direct control of Government. However, many of the changes in costs are flow-on effects of policy choices made by the Government (e.g., benefit indexation is a policy choice).

Table 1 (reproduced from Budget 2010) shows that the Operating Allowance only accounts for a small portion of the forecasted increase in total spending expected in each financial year.

However, as discussed below, many of these other items would have remained outside the spending cap for various reasons.

## *6.2 Design of a spending cap*

This section outlines the main design features of a possible spending cap designed to work within New Zealand's existing institutional framework. We have drawn on the experiences of the Netherlands, Sweden and Finland, adopting the aspects that best suit our objectives and New Zealand's economic and fiscal environment.

On the face of it, the idea of a cap on government spending sounds relatively simple. However, as noted below, many of those countries with existing expenditure caps have a range of exclusions. On reflection Treasury considered that some exclusions would likely be appropriate in the New Zealand context, for the reasons outlined below.

The proposed spending cap would have been for an absolute dollar figure for government spending based on core Crown expenses – this is a measure of operating expenses. The measure would have therefore excluded capital spending and the spending undertaken by State Owned Enterprises (SOEs). Crown funding of Crown entities would fall under the cap. The rationale for excluding capital spending was so that governments would be less likely to cut back on potentially productive capital projects instead of stopping or scaling back ongoing programmes out of operating expenditure. While this runs the risk of expenditure that should be considered as operating expenditure being classified as capital spending, prudent accounting practices and the maintenance of the debt objective would likely have helped limit such practices.

To reduce the risk of the spending cap making fiscal policy more pro-cyclical (e.g., to prevent the need to cut spending during times of recession in order to reduce the deficit), we thought it would have been appropriate to exclude unemployment benefit spending and debt finance expenses from the coverage of the cap.

We also thought it would have been appropriate to exclude remeasurements, losses and debt impairment because these are large and volatile items of spending which are seen to be outside the direct control of the Government.

Given data limitations and the compliance costs of overcoming those limitations, tax expenditures would not have been included. However, the Treasury is working to improve the accountability and transparency of tax expenditures (Fookes, 2009), which will likely make it more difficult and transparent for Governments to use tax expenditures to circumvent other budgetary processes. As part of Budget 2010, the Government released some information about tax expenditures as a step towards increasing transparency.<sup>9</sup>

The proposed spending cap would have been set in nominal terms to avoid the need to deflate a target set in real terms. In addition, a nominal target would tend to result in less procyclicality of fiscal policy than would a real target or a short-term ratio to GDP target.

Under the proposed design, the expenditure cap would have been set for three years with the third year out being set on a rolling basis. For example, Budget 2011 could have set the caps for 2011-12, 2012-13 and 2013-14. In Budget 2012, the cap for 2014-15 would have been set. The cap for 2014-15 would then have been set in light of the overall expense path needed to remain on track

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<sup>9</sup> See: <http://www.treasury.govt.nz/budget/2010/taxexpenditure>

to achieve the fiscal strategy. The caps for 2012-13 and 2013-14 could not have been revised upwards in Budget 2011, though they could have been revised down.<sup>10</sup>

The Operating Allowance for new operating initiatives would have been retained. The Operating Allowance seeks to limit new discretionary spending and revenue initiatives, while the spending cap would have sought to limit total spending. However, there is a link between the two. The expense forecasts assume that all of the Operating Allowance will be used for expenses rather than revenue. If a portion of the Operating Allowance was subsequently used for revenue initiatives, that amount would not be available for new operating spending. Thus, the new path of forecast expenses would be lower than the original forecast. As a result, with an unchanged spending cap, there would appear to be extra room under the cap (*i.e.*, a larger margin) equal to the size of the revenue initiative. Therefore it would be important to ensure the Government did not revise the Operating Allowance to try to make use of the extra room under the cap.

### 6.3 Setting the cap

Consistent with the intent of the PFA, the level of the proposed cap would have been set by the current administration, rather than prescribed in a way that attempts to set the cap for future, yet-to-be-elected governments. Although an incoming Government would have the ability to reset the spending cap, the transparent nature of New Zealand's fiscal framework means that the new Government would have been expected to explain and justify any change.

To set the cap, the Government would have started with the forecasts of expenses being subject to the cap. These forecasts would have included the base as well as the expected profile over time plus the Operating Allowance for new operating initiatives – The forecasted amount is the amount the Government expected to spend. The Government would then add a margin (itself not in the forecasts) to that forecast level of spending. That margin would be designed to provide a buffer for unforeseen movements in forecast expenses (*e.g.*, those that go through the Baseline Update process). The forecast amount plus the margin would determine the level of the cap – this is the amount the Government promises not to exceed.

The spending cap would have reinforced the limit on new discretionary spending imposed by the Operating Allowance as well as placing an indicative limit on the changes to forecasted costs – described in Section 4. However, because the calculation of the cap is based on the existing forecasts, the spending cap would not have placed any limit on the increase in expenses due to changes in the profile of existing spending. For example, it would have incorporated the existing forecast increase in NZS, expected over time as increasing numbers of people reach 65 years of age.

The level of the cap, and therefore the margin, would have essentially been an explicit commitment by the Government not to increase spending above that level. As such, the cap (and the margin) would not have represented an amount of money that is available for spending (unlike the Operating Allowance). Even if the Government only used a small amount of the margin (*i.e.*, did not exceed the cap), it would still have been spending more than it originally forecast.

The size of the margin would have been an important element in the credibility of the spending cap. If it was set too tight, the Government may have been required to make significant cuts to spending in other areas to accommodate forecast changes, or risk revoking the cap. If it was set too loose, the spending cap would exert no effective fiscal discipline.

<sup>10</sup> Some countries do allow for revisions for technical changes or changes with justification.

But the appropriate size of the margin is dependent on the other measures used to provide flexibility within the cap. If most of the cyclical or other volatile elements were excluded from the coverage of the cap, the size of the margin would be smaller than if those elements remained. The rules around what happens if the Government exceeds the cap are also pertinent. If exceeding the cap was not permitted or was reputationally costly, we would expect the margin to have been higher than if there were softer penalties for breach.

In assessing the size of the margin we looked at the size of the margin in other countries. The largest margin of 1 per cent of government expenditure in any one year is used by Sweden, which does not exempt any items from its expenditure ceiling, but governments there are able to use some of the margin for new discretionary spending. Their experience suggests that the lack of other exclusions significantly helps with the communication and monitoring of their cap. The Netherlands' ceiling covers about 85 per cent of government expenditure and has a margin of about 0.5 per cent. Additional leeway was provided by a deliberate policy of using conservative forecasts. Finland's ceiling covers 75 per cent of government expenditure and their margin is about 0.25 per cent.

To help determine an appropriate margin for New Zealand we undertook an analysis of past changes in expense data to assess how large a margin would have had to have been to cover the fluctuations that occurred. This could only be a hypothetical analysis given that a spending cap was not in place at the time and fiscal circumstances were different (*i.e.*, the revenue surprises discussed in Section 4).

In assessing the size of the margin, we also considered other differences between New Zealand and the countries that currently operate spending caps. For example, New Zealand is a small open economy, meaning that the economy and the fiscal position are likely to be more volatile than in larger, less open, economies. Furthermore, New Zealand is one of just a handful of countries that reports its fiscal accounts on an accrual basis rather than a cash basis. This has the potential to add to the complexity of communicating outturns relative to a cap.

Weighing up all of these factors, our preference was for a margin of around 1 per cent of spending covered by the cap. For 2008-09 this would have been \$550 million. A margin of 1 per cent would have been at the upper end of the margins used in other countries. This largely reflects the fact that the proposed New Zealand cap captures a larger share (95 per cent in 2008-09) of total spending than many of the caps of these other countries.

#### 6.4 Breaching the cap

Under the proposed design, if spending exceeded the cap, the Government would have stated either in the *Budget Policy Statement* or in the *Fiscal Strategy Report* the reasons for the breach and what steps it would take to reduce spending to ensure it did not breach subsequent caps. There would not have been any explicit sanction for breaching the cap, but unless action was taken to reduce spending by the amount that the cap was breached, there would be an increased likelihood of further breaches. A breach of the cap in any one year would have used a portion of the margin available for subsequent year(s).

Any spending above the forecast level of expenses (even if it did not breach the cap) would have, subject to a given revenue track, reduced the operating balance (*i.e.*, reduce a surplus or increase a deficit) and increased debt. If spending increased to a level close to but not above the cap, this would have been revealed in the *Budget Policy Statement* or *Fiscal Strategy Report* documents. There would have been an expectation that the Government would comment on the likelihood of a breach and what the Government would do to avoid the breach occurring.

The cap would have been monitored at the aggregate level so it would be a collective Cabinet decision about where spending is reduced to address any excess. There would be a number of options for Cabinet; for example, it could:

- require the department with higher-than-expected expenditure to reduce baseline spending to accommodate the additional costs;
- find baseline savings in another vote; or
- reduce new operating initiatives (*i.e.*, the Operating Allowance).

Thus, if spending was higher than expected because of higher-than-forecast school enrolments, the Cabinet might choose either to reduce baseline spending in Education or find savings elsewhere to increase the Education baseline by the amount of the overspend or charge the overspend against the Operating Allowance.

### 6.5 *Main changes from the current system*

The biggest change from the current system would have been the inclusion under the cap of changes in forecasted costs that currently go through the Baseline Update process such as higher than expected costs of benefit indexation. This would mean that large increases in those items could potentially have resulted in tradeoffs with other spending, which does not occur in the current system.

The spending cap process would have put a lot more focus on the generation of the spending forecasts. There might have been an incentive for departments to pad their forecasts of spending to provide additional room for unexpected expenditure. However, this would have to have been balanced by the risk that if Ministers consider a department's spending to be inefficient they could be a target for savings to be made.

The spending cap would also have been a fixed commitment to an annual level of spending over a three year period. Given that the cap would have been introduced under the existing PFA, revisions to the cap could not have been ruled out, but any increase in the cap would have to be transparent and would have needed to be justified.

The commitment to the spending cap would also have committed the Government to a maximum level of the Operating Allowance in those years. Revisions to the Operating Allowance would generally have required revisions to the spending cap as well. The main implication of this is that temporary increases of revenue above the forecast level would not have been able to be used to increase spending during the period of the cap. The main reason for this was to ensure that increases in revenue that occurred for cyclical/temporary reasons were not spent. While the increases in revenue may be structural or permanent, it can take a number of years to identify the change in trend. If those revenue increases are in fact structural, they could then have been built into expectations about increased spending and tax cuts when the cap was reset for the third year out.

### 6.6 *Risks around adopting a cap*

The adoption of a spending cap would have carried some risks, as outlined below.

- It could have reduced the flexibility to deal with shocks as the spending cap could have reduced a Government's ability to engage in counter-cyclical spending during times such as the recent global financial crisis. The placement of unemployment benefit spending outside the cap helps to mitigate against this risk because this is the main cyclical item of expenditure. Countries such as Sweden and Finland have come through the global financial crisis without technically



breaching their expenditure ceilings. In Sweden, this was assisted by the fact that some of the margin can be used for new discretionary spending which has been counter-cyclical in recent years. Others, such as the Netherlands, have made temporary amendments to their spending cap during the recent recession.

- It could have hampered the Government in dealing with other shocks such as a population shock where a migration boom lead to a spike in economic growth and revenue but also health, education and other spending. While a sharp increase in population could happen quickly, the spending implications are likely to follow over time. The occurrence of such a shock may be an instance where the Government could have been prepared to explain a revision to the cap.
- It could have been complex to communicate, in simple terms, the entire design specification of the cap. This could have undermined its effectiveness.
- Implementing the cap within the existing framework of the PFA might have meant the cap was not durable as any incoming Government would not have been bound to follow the same protocol.
- The spending cap would not have solved the problem of the inability to accurately differentiate temporary and permanent revenue surprises. Governments might still have decided to increase spending in the third year in response to a surprise increase in revenues, only to find by the time the third year came around that those revenues were temporary. The Government would still have had the option of revising down the cap if they chose.
- The cap could have become a target rather than an upper limit – the Government might have faced pressure to increase spending up to the maximum permissible even in situations where it would have been prudent to reduce spending.

#### 6.7 *Other proposals for managing government spending*

The above-mentioned questions about the attention paid to the base of spending, as well as questions around how a cap on total spending could bolster existing arrangements, have prompted discussion around alternative approaches to managing government spending. There are a range of alternative proposals. Two that have been discussed within New Zealand are detailed below.

A recent Government-initiated taskforce proposed that the PFA be amended to require the Minister of Finance to specify a five-to-ten year target for future operating spending – either the real per capita level of spending, or spending as a share of GDP (2025 Taskforce, 2009). The Minister would also be required to report publicly on progress relative to that goal. The proposal seeks to put the spotlight on the implications of the fiscal strategy for the size of government. The Taskforce holds the view that growth in government spending should be restrained, so that core Crown expenses decrease as a share of GDP – initially to 2005 levels (30 per cent of GDP), with the medium-term goal being 20 per cent of GDP. The PFA allows for spending intentions and objectives to be couched as a target share of GDP. The Minister of Finance set such a target in the 1995 *Budget Policy Statement*, although this practice has not been consistently applied.

A more prescriptive spending rule, in the form of a Taxpayer Rights Bill, has been proposed by the ACT Party, one of the governing National Party's support parties in Parliament. A similar Bill was proposed in Wilkinson (2004), drawing on the experience of Colorado in the United States. Such a Bill would limit spending growth to the rate of inflation plus the rate of population growth, with any proposal for higher spending being subject to a referendum. Furthermore, it would require any revenue above that limit to be refunded to taxpayers, unless retention of this excess revenue is approved by referendum. A legislated limit on expenses and revenue would require the PFA's principles of responsible fiscal management to be revisited. This is because the

principles are based on requiring governments to be transparent when setting their fiscal strategy, whereas a highly-prescriptive fiscal rule would, in effect, largely be determining the fiscal strategy.

While this report has focussed on one possible design for a cap on total spending, there are other possible designs which may be relevant, depending on the objectives of the cap. For example, a cap could be used to place a limit on a particular type of expenditure rather than total spending.

## **7 The Government's response**

Reflecting on the above analysis, the Government decided not to introduce a formal cap on total spending in Budget 2010. Although a cap on total spending could have brought some benefits, there are also some risks, particularly associated with the complexity of the proposal. The Government considers that the current system, which includes a cap on new initiatives (including both revenue and expenses), namely the Operating Allowance, achieves some of the key objectives of a total spending cap. In particular, the Government's commitment to maintaining the Operating Allowance of \$1.1 billion (increased by 2 per cent per annum from 2011-12) suggested that any future revenue surprises will not be used to increase spending.

Meanwhile, the Government continues to look for ways to address the other issues identified such as increasing the range of expenses subject to an effective limit and increasing the focus on the base rather than just the marginal spend. For example, for Budget 2010, the Minister of Finance initiated a reprioritisation process that resulted in \$1.8 billion of savings within existing baselines being redirected to higher priority areas over the four-year forecast period. Budget 2010 also indicated that various aspects of the current FMA will be reconsidered with a view to improving the Government's ability to scrutinise expenditure increases that at present are not counted against the Operating Allowance.

## **8 Conclusion**

New Zealand's existing fiscal framework – centred around the principles embedded in the Public Finance Act – contributed to New Zealand entering the global financial crisis with historically and internationally low levels of public debt. However, the focus on debt did not prevent Government spending increasing as a percent of GDP. This paper considered whether a spending cap would be a beneficial addition to the fiscal tool kit.

To be effective, a spending cap needed to fit into the existing FMA and be supported by a strong political will to be bound by the cap. The proposal considered in this paper entailed a rolling three-year nominal target for core Crown expenses, as set by the government. It was designed to have a range of exclusions, such as unemployment benefit expenses (which are cyclical and part of the automatic stabilisers). In addition, there was to be a margin to accommodate unexpected changes in forecast expenses.

The benefits of the proposed spending cap are that it would have reinforced the commitment to the existing limit on new initiatives (the Operating Allowance) and placed an indicative limit on changes to forecasted expenses that go through the Baseline Update process. However, the complexity of the proposal would have led to significant communication challenges. There may have been some confusion about how it would operate alongside the existing system.

The review of the FMA, signalled in Budget 2010, will assess whether more of the changes to forecasted expenses should be "counted" within the Operating Allowance. Ideally, future arrangements will also allow the fiscal pressures associated with the rising profile of some categories of demand-driven expenses (e.g., New Zealand Superannuation, some categories of

welfare benefits) to be more clearly identified and compared at the same time as decisions are being made around new spending initiatives. A simple and transparent approach will ensure that the underlying trade-offs around current policy settings and their long-term fiscal effects are visible. This will contribute to New Zealand having a sustainable future fiscal path and being well-placed to respond to long-term fiscal challenges.

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## FISCAL MULTIPLIERS IN THE EURO AREA

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*In a standard linear structural VAR framework we analyse the size and sign of fiscal multipliers in the euro area, using a newly available quarterly dataset of fiscal variables for the period 1981-2007. From a policy perspective, the analysis of fiscal multipliers in “average times” provides insights on the impact of both fiscal stimulus and fiscal consolidation measures, provided “good” and “bad” times are on average similar.*

### 1 Introduction

The discussion on the negative impact of fiscal consolidation measures is nowadays extremely topical, as it was slightly more than half a year ago the symmetric discussion on the positive impact of discretionary fiscal measures to stimulate the economic activity implemented to soften the economic downturn. Indeed, by June 2009 almost all OECD economies and many emerging countries had announced or implemented some sort of fiscal stimulus packages. In the case of European economies, the European Commission launched at the end of 2008 the “European Economic Recovery Plan” (EERP), aimed at providing a coordinated fiscal stimulus for the European Union (EU) as a whole. Since the end of 2009 in some countries and more widespread in the course of 2010, the case for fiscal stimulus has turned into the case for fiscal consolidation.

The quantification of the potential negative effects of contractionary fiscal measures on the economy is now crucial. At first sight, given the quasi-agreement of both international organizations and academic economists on the beneficial effects of fiscal stimulus, one may guess that the symmetric policy should depress output.

At the current juncture, the economic impact of fiscal packages remains uncertain. This is certainly the case for the euro area, given the scarcity of relevant studies. Given the single monetary policy in the euro area since 1999, and the synchronization of monetary policies already since the beginning of the 1990s among core euro area countries, the aggregate analysis of fiscal policy shocks for the area as a whole is a pertinent endeavour. Even though fiscal policy has been a country-specific issue over the last two decades,<sup>1</sup> the use of historical data in euro area wide models is of practical relevance for policy makers.<sup>2</sup> And given the potential importance of spillover effects of fiscal policy in a highly integrated area such as the EMU, the results available for some

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<sup>1</sup> This has been the case even under the operation of the Stability and Growth Pact, the fiscal policies' coordination agreement in place in the EU since 1999.

<sup>2</sup> See, for instance, Smets and Wouters (2003, 2005); Fagan *et al.* (2005); Christoffel *et al.* (2008); and Ratto *et al.* (2009).

specific countries<sup>3</sup> do not necessarily provide a good guidance for analysing the macroeconomic impact of fiscal shocks in the euro area as a whole.

Thus, the main aim of this paper is to assess the impact of fiscal policy shocks in a (weighed) representative euro area country (the euro area aggregate) on inflation and GDP, the key macroeconomic variables of interest for the ECB. We focus on the sample 1981-2007.<sup>4</sup>

Along the lines of the most recent and standard strand of the literature that started with Blanchard and Perotti (2002), the effects of fiscal policy shocks are assessed within a SVAR framework where identification of fiscal policy shocks is achieved by exploiting decision lags in policy making and information about the elasticity of fiscal variables to economic activity. Along the lines of our broader study Burriel *et al.* (2010), we focus on a standard methodology for comparability with previous results for other areas/countries. Thus, we aim at capturing the average impact of fiscal policies on GDP. Clearly, our analysis leaves aside the likely non-linear responses of consumers to changes in policies and differences in the extant policy regime (periods of expansionary fiscal policy vs periods of fiscal consolidation under fiscal stress) that might turn out to be crucial to rationalize the impact of fiscal policies in “good” and “bad” times.

We find for the euro area standard qualitative responses of GDP and inflation to government spending and net-tax shocks. Our results are within the standard ranges of results obtained in similar empirical studies for the US and euro area countries.<sup>5</sup> To make it short: expansionary fiscal shocks do have a short-term positive impact on GDP and private consumption, with government spending shocks entailing, in general, higher effects on economic activity than (net) tax reductions.

The rest of the paper is organised as follows: Section 2 describes the data, Section 3 methodological issues and Section 4 the results. Finally, we present some concluding remarks in Section 5.

## 2 The data

As in Blanchard and Perotti (2002) and Perotti (2004), the baseline VAR estimated in this paper includes quarterly data on public expenditure ( $g_t$ ), net taxes ( $t_t$ ) and GDP ( $y_t$ ), all in real terms,<sup>6</sup> the GDP deflator ( $p_t$ ) and the ten-year interest rate of government bonds ( $r_t$ ).<sup>7</sup> All variables are seasonally adjusted and enter in logs except the interest rate, which enters in levels.

The definition of fiscal variables follows Blanchard and Perotti (2002). In particular, government spending ( $g_t$ ) is defined as the sum of government consumption and investment, while net taxes ( $t_t$ ) are defined as total government current receipts, less current transfers and interest

<sup>3</sup> For euro area country studies see Heppke-Falk *et al.* (2006) for Germany, De Castro (2006) and De Castro and Hernández De Cos (2008) for Spain, Giordano *et al.* (2007) for Italy, Marcellino (2006) for the four largest countries of the euro area or Afonso and Sousa (2009a, 2009b) for Germany, Italy and Portugal, and Bénassy-Quéré and Cimadomo (2006) and Beetsma and Giuliodori (2009) for a group of EU countries. On different grounds, Jacobs *et al.* (2007) incorporate a fiscal closure rule in a VAR for the euro area.

<sup>4</sup> The scarcity of results analysing the impact of fiscal shocks for the euro area as a whole and the countries thereof, is ultimately due to the lack of quarterly data for the general government sector. In fact, until very recently, official data following national accounts conventions for the EMU and the countries comprising it, covering a wide set of variables, were only available in non-seasonally adjusted terms for the period 1999Q1 onwards. This limitation has been recently overcome by Paredes *et al.* (2009) that provide a quarterly fiscal database for the euro area aggregate for the period 1980Q1-2007Q4. The raw ingredients they use are closely linked to the ones used by national statistical agencies to provide their best estimates (intra-annual fiscal data, mostly on a cash basis), and they preserve full coherence with official, annual data.

<sup>5</sup> For a discussion on fiscal multipliers in simulation models see Cwik and Wieland (2009) and Cogan *et al.* (2009).

<sup>6</sup> In all cases the GDP deflator is employed so as to obtain the corresponding real values.

<sup>7</sup> The long-term interest rate is preferred to the short-term one because of its closer relationship with private consumption and investment decisions. However, this choice turned out to be immaterial to the results in that the inclusion of short-term rates in the VAR led to similar conclusions.



payments on government debt.<sup>8</sup> The reason for this grouping is that government spending on goods and services might have different effects, as it affects directly the aggregate demand of the economy, while transfers and taxes exert their effects through real disposable income that could be partially saved. These definitions have become commonplace in the most recent empirical literature. Given this definitions, the general government primary balance is obtained as the difference between the levels of  $t_t$  and  $g_t$ . We use data covering the period 1981:Q1 to 2007:Q4.

Fiscal data have been taken from a newly available quarterly fiscal data set compiled by Paredes *et al.* (2009). They employ intra-annual fiscal data, mostly on a cash basis, in a mixed-frequencies state space model to obtain quarterly fiscal data for the aforementioned period. These data ensure consistency with annual and quarterly national accounts data where available. The main advantage of the new Paredes *et al.* (2009) data set is that it avoids the endogenous bias that arises if fiscal data interpolated on the basis of general macroeconomic indicators were used with macroeconomic variables to assess the impact of fiscal policies. These variables are seasonally adjusted according to the statistical model used to draw the corresponding quarterly data.<sup>9</sup> Other macroeconomic data for the euro area are taken from ECB's Area Wide Model Database (see Fagan *et al.*, 2005).

### 3 The (S)VAR model

#### 3.1 Specification

We apply the structural vector autoregressive approach proposed by Blanchard and Perotti (2002) and Perotti (2004). The basic point in this approach is that identification of fiscal policy shocks is achieved by exploiting decision lags in policy making and information about the elasticity of fiscal variables to economic activity.

The reduced-form VAR is specified in levels and can be written as:

$$X_t = D(L)X_{t-1} + U_t \quad (1)$$

where  $X_t \equiv (g_t, t_t, y_t, p_t, r_t)$  is the vector of endogenous variables and  $D(L)$  is an autoregressive lag polynomial. The benchmark specification includes a constant term, but no deterministic time trends. The vector  $U_t \equiv (u_t^g, u_t^t, u_t^y, u_t^p, u_t^r)$  contains the reduced-form residuals, which in general will present non-zero cross-correlations. The VAR includes two lags of each endogenous variable according to the information provided by LR tests, the Akaike, Schwarz and Hannan-Quinn information criteria and the final prediction error.<sup>10</sup>

#### 3.2 Identification strategy

The reduced-form residuals have little economic significance in that they are linear combinations of structural shocks. In particular, the reduced-form residuals of the  $g_t$  and  $t_t$  equations,  $u_t^g$  and  $u_t^t$ , can be thought of as linear combinations of three types of shocks: a) The automatic responses of spending and net taxes to GDP, price and interest rate innovations,

<sup>8</sup> More concretely, transfers include all expenditure items except public consumption, public investment and interest payments.

<sup>9</sup> Another alternative would consist in using TRAMO-SEATS (see Gómez and Maravall, 1996) to extract the seasonal component.

<sup>10</sup> In order to assess the robustness of our results to different specifications and transformations, we tried several alternatives, including estimating with variables in per capita terms, adding a time trend, allowing for four lags instead of two and substituting the long-term interest rate by a short-term one. These different alternatives showed broadly the same qualitative results and are available upon request.

b) systematic discretionary responses of fiscal policy to the macro variables in the system (for instance, reductions in tax rates that some countries could implement systematically in response to recessions), and c) random discretionary fiscal policy shocks, which are the truly uncorrelated structural fiscal policy shocks. Thus, from (1) the reduced-form residuals in the first two equations can be expressed as:

$$u_t^g = \alpha_{g,y} u_t^y + \alpha_{g,p} u_t^p + \alpha_{g,r} u_t^r + \beta_{g,t} e_t^t + e_t^g \quad (2a)$$

and:

$$u_t^t = \alpha_{t,y} u_t^y + \alpha_{t,p} u_t^p + \alpha_{t,r} u_t^r + \beta_{t,g} e_t^g + e_t^t \quad (2b)$$

where  $e_t^g$  and  $e_t^t$  are the “structural” discretionary fiscal shocks. As we are interested in analysing the effects of  $e_t^g$  and  $e_t^t$ , on the rest of the variables of the system, estimations for the  $\alpha_{ij}$ 's and  $\beta_{ij}$ 's in (2) are needed.

The approach we follow here is based on Blanchard and Perotti (2002). The key to this approach is the observation that approving and implementing new measures in response to innovations in the main macroeconomic variables typically takes longer than three months. Hence, the use of quarterly variables allows for setting the discretionary contemporaneous response of government expenditure or net taxes to GDP, prices or interest rate innovations to zero. Therefore, the coefficients  $\alpha_{ij}$ 's in (2a) and (2b) only reflect the automatic responses of fiscal variables to innovations in the rest of the variables of the system, the first component aforementioned, and they can be estimated using institutional information on the elasticity of taxes and spending to GDP, prices and the interest rate. In particular, given that interest payments on government debt are excluded from the definitions of expenditure and net taxes, the semi-elasticities of these two fiscal variables to interest rate innovations, *i.e.*  $\alpha_{g,r}$  and  $\alpha_{t,r}$ , are set to zero. While this assumption appears justified for government expenditure and plays no role when analysing its effects, it is slightly more controversial for net taxes.<sup>11</sup>

Consider now equation (2a). Our choice of the items included in the definition of government expenditure, notably public consumption and investment, makes it hard to think about any automatic response of public expenditure to economic activity. Accordingly, we can set  $\alpha_{g,y} = 0$ . The case of the price elasticity is different, though. Some share of purchases of goods and services is likely to respond to the price level. In addition, the wage component is typically indexed (either formally or via *ex post* adjustments) to the CPI, even though indexation takes place with some delay. Thus, we adopted the same eclectic approach as in Perotti (2004), according to which the price elasticity of government expenditure was set to  $-0.5$ .

The output and price elasticities  $\alpha_{ij}$  in (2b) are weighted averages of the elasticities of the different net-tax components, including transfers, computed on the basis of information like statutory tax rates and estimations of the contemporaneous responses of the different tax-bases and, in the case of transfers, the relevant macroeconomic aggregate to GDP and price changes. In general, contemporaneous output elasticities of net taxes can be calculated as:

$$\alpha_{t,y} = \sum_i \varepsilon_{T_i, B_i} \varepsilon_{B_i, y} \frac{T_i}{T} \quad (3)$$

<sup>11</sup> In many cases, the income tax base includes interest income as well as dividends, which in general co-vary negatively with interest rates. Nevertheless, the full set of effects of interest rate innovations on the different tax categories are very complex to analyse and, on the other hand, their contemporaneous effects are deemed to be very small.

with  $T = \sum T_i$  being the level of net taxes,<sup>12</sup>  $\varepsilon_{T_i, B_i}$  the elasticity of the  $i^{\text{th}}$  category of net taxes to its own tax base and  $\varepsilon_{B_i, y}$  the GDP elasticity of the tax base of the  $i^{\text{th}}$  category of net taxes. Price elasticities for some components of net taxes were, however, obtained directly by econometric estimation, whereas others were calibrated.

According to our estimations, output elasticity is 1.54, whereas price elasticity amounts 1.14.<sup>13</sup> These elasticities are similar to those obtained in previous papers. For instance, Perotti (2004) gauges an output elasticity of 1.97 for the USA (for the subsample 1980-2000), while the price elasticity is set to 1.4. There are no reference values for the euro area though. The closer available results would be those for Germany, estimated at 0.72 and 0.98 in Heppke-Falk *et al.* (2006). The higher euro area results compared to Germany might indicate, among other factors, the presence of cross-country spill-over effects that potentially lead to higher multipliers than at the national level.

Once output and price elasticities have been estimated, the so-called “adjusted” fiscal shocks ( $u^{CA}$ ) can be derived as follows:

$$u_t^{g, CA} = u_t^g - (\alpha_{g, y} u_t^y + \alpha_{g, p} u_t^p + \alpha_{g, r} u_t^r) = \beta_{g, t} e_t^t + e_t^g \quad (3a)$$

$$u_t^{t, CA} = u_t^t - (\alpha_{t, y} u_t^y + \alpha_{t, p} u_t^p + \alpha_{t, r} u_t^r) = \beta_{t, g} e_t^g + e_t^t \quad (3b)$$

As mentioned in Perotti (2004), there is little guidance, theoretical or empirical, on how to identify the two structural shocks in (3a) and (3b). We assume that expenditure decisions are prior to tax ones, which implies a zero value for  $\beta_{g, t}$ . This allows us to retrieve  $e_t^g$  directly from (3a) and to use it in (3b) in order to estimate  $\beta_{t, g}$  by OLS.<sup>14</sup> Since we are interested in studying the effects of fiscal policy shocks, the ordering of the remaining variables is immaterial to the results. Accordingly, the reduced-form output residuals are assumed to be a linear combination of the fiscal shocks.

$$u_t^y = \gamma_{y, g} u_t^g + \gamma_{y, t} u_t^t + e_t^y \quad (4)$$

By definition, some contemporaneous correlation between the reduced-form residuals of the fiscal equations and  $e_t^y$  is expected. Hence (4) is estimated by instrumental variables, using the structural uncorrelated fiscal shocks  $e_t^g$  and  $e_t^t$  as instruments for  $u_t^g$  and  $u_t^t$ , respectively. Likewise, the coefficients of  $\Gamma$  corresponding to the price and interest rate equations can be obtained in turn in a similar way.

The innovations model can be written as  $\Gamma U_t = B V_t$ , where  $V_t \equiv (e_t^g, e_t^t, e_t^y, e_t^p, e_t^r)$  is the vector containing the orthogonal structural shocks. The respective matrixes  $\Gamma$  and  $B$  can be written as:

<sup>12</sup> The  $T_i$ 's are positive in the case of taxes and negative in the case of transfers.

<sup>13</sup> Table A1 provides further details about the different elasticities behind these aggregate output and price elasticities.

<sup>14</sup> As shown in Perotti (2004), the correlation between the two cyclically adjusted fiscal shocks is very low, so the ordering is immaterial for the results.

$$\Gamma = \begin{pmatrix} 1 & 0 & -\alpha_{g,y} & -\alpha_{g,p} & -\alpha_{g,r} \\ 0 & 1 & -\alpha_{t,y} & -\alpha_{t,p} & -\alpha_{t,r} \\ -\gamma_{y,g} & -\gamma_{y,t} & 1 & 0 & 0 \\ -\gamma_{p,g} & -\gamma_{p,t} & -\gamma_{p,y} & 1 & 0 \\ -\gamma_{r,g} & -\gamma_{r,t} & -\gamma_{r,y} & -\gamma_{r,p} & 1 \end{pmatrix}$$

and

$$\mathbf{B} = \begin{pmatrix} 1 & \beta_{g,t} & 0 & 0 & 0 \\ \beta_{t,g} & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

Accordingly, the reduced-form residuals are linear combinations of the orthogonal structural shocks of the form  $U_t = \Gamma^{-1}\mathbf{B}V_t$ .

### 3.3 Possible weaknesses of the SVAR approach to model fiscal policy shocks

One frequent criticism to the identification of quarterly fiscal policy shocks is that fiscal decisions are mainly taken on a year-by-year basis as embedded in the budget. However, while acknowledging that the yearly budget incorporates important policy measures, supplements to it and other decisions affecting fiscal policy during the year are always possible and, indeed, have been commonplace in most of the sample period under consideration.

Another important criticism relates to implementation lags, *i.e.* the typical long lag between the announcement of a fiscal measure, and the time the measure is actually adopted. Under rational expectations, economic agents adjust their decisions on consumption, saving and labour supply as soon as they have information on future changes in fiscal policy. If this is the case, the VAR-based estimated effects on the basis of quarterly data might be biased, although the sign of the bias is not clear. In particular, Ramey (2007) finds that failing to account for the anticipation effect causes the SVAR to capture shocks too late, missing some non-keynesian effects of fiscal policy (the initial decline in consumption that occurs as the news is known). By contrast, Blanchard and Perotti (2002) and Heppke-Falk *et al.* (2006) try to address this criticism including an indicator of future fiscal policy measures in their estimation procedure, finding qualitatively similar results. Perhaps, the existence of liquidity constraints or the presence of shortsighted consumers might reduce the significance of the announcement effect. Leeper *et al.* (2008) analyse the difficulties that fiscal foresight introduces in the estimation and interpretation of conventional analyses of fiscal shocks; even though they show that not accounting for anticipation effects might distort the interpretation of net taxes' shocks,<sup>15</sup> they also hint that under certain circumstances foresight might not impinge on the identification of other shocks, like government spending shocks. However, Yang (2007) argues that including lagged interest rates and prices leads to lower responses to tax shocks in that lagged interest rates and prices contain information about macroeconomic variables related to current tax changes. Thus, the inclusion of prices and interest rate in our VAR might help assuage the foresight problem.

<sup>15</sup> See also Yang (2005).

Finally, Favero and Giavazzi (2007) argue that the omission of public debt in the VAR leads to biased results as they fail to take into account the debt dynamics that arises after a fiscal shock and, more importantly, overlook the possibility of taxes and spending responding to the level of debt. We address this issue and include debt (changes in debt) in a similar way as Favero and Giavazzi in Burriel *et al.* (2010).

## 4 The effects of government spending and tax shocks

### 4.1 Interpreting the fiscal shocks

Figure 1 represents the fiscal shocks that we estimate in our baseline VAR for the EMU. In general, the largest fiscal shocks tend to be associated with episodes of discretionary government actions. Beginning with spending, negative shocks in public spending are found throughout the period 1994-97 related to the fiscal consolidation episodes previous to the euro adoption, as the decision whether or not a country entering EMU was taken on the basis of the fiscal deficit recorded in 1997. We identify also positive shocks in 1990-91 associated with the German reunification process that was followed by a significant increase in public spending. In the case of net revenue, we estimate positive residuals along the years 1995-97, related also to the fiscal consolidation process previous to the EMU accession.

### 4.2 The baseline VAR

Figure 2 displays the responses of the endogenous variables to a positive expenditure shock.<sup>16</sup> Firstly, after a spending shock, GDP increases and remains significant for five quarters, becoming non-significant thereafter. This result is largely in line with previous evidence for the US and other countries. In general, government spending shocks are found to yield positive output responses in the short-term (Perotti, 2004; Neri, 2001; Mountford and Uhlig, 2009), although the size and persistence of output multipliers varies significantly across studies.<sup>17</sup>

As for the impact of a government spending shock on the other variables in the system, prices increase with respect to the baseline, leading to a hump-shaped response of inflation. Despite being a rather intuitive and, on the other hand, expected result, previous evidence is far from conclusive. For example, Fatás and Mihov (2001) and Mountford and Uhlig (2009) find negative effects on prices and inflation, whereas in the case of Marcellino (2006) the impact found is not significant in the case of Germany, Spain and Italy and positive in the case of France. In turn, Perotti (2004) reports mixed evidence depending on the country and period under consideration. Likewise, the long-term interest rate rises in response to the shock and remains significant for more than 2 years.<sup>18</sup>

Cumulative multipliers<sup>19</sup> to expenditure shocks are shown in Table 1. Output multipliers are rather low, slightly below 1 in the first year following the shock, diminishing thereafter and

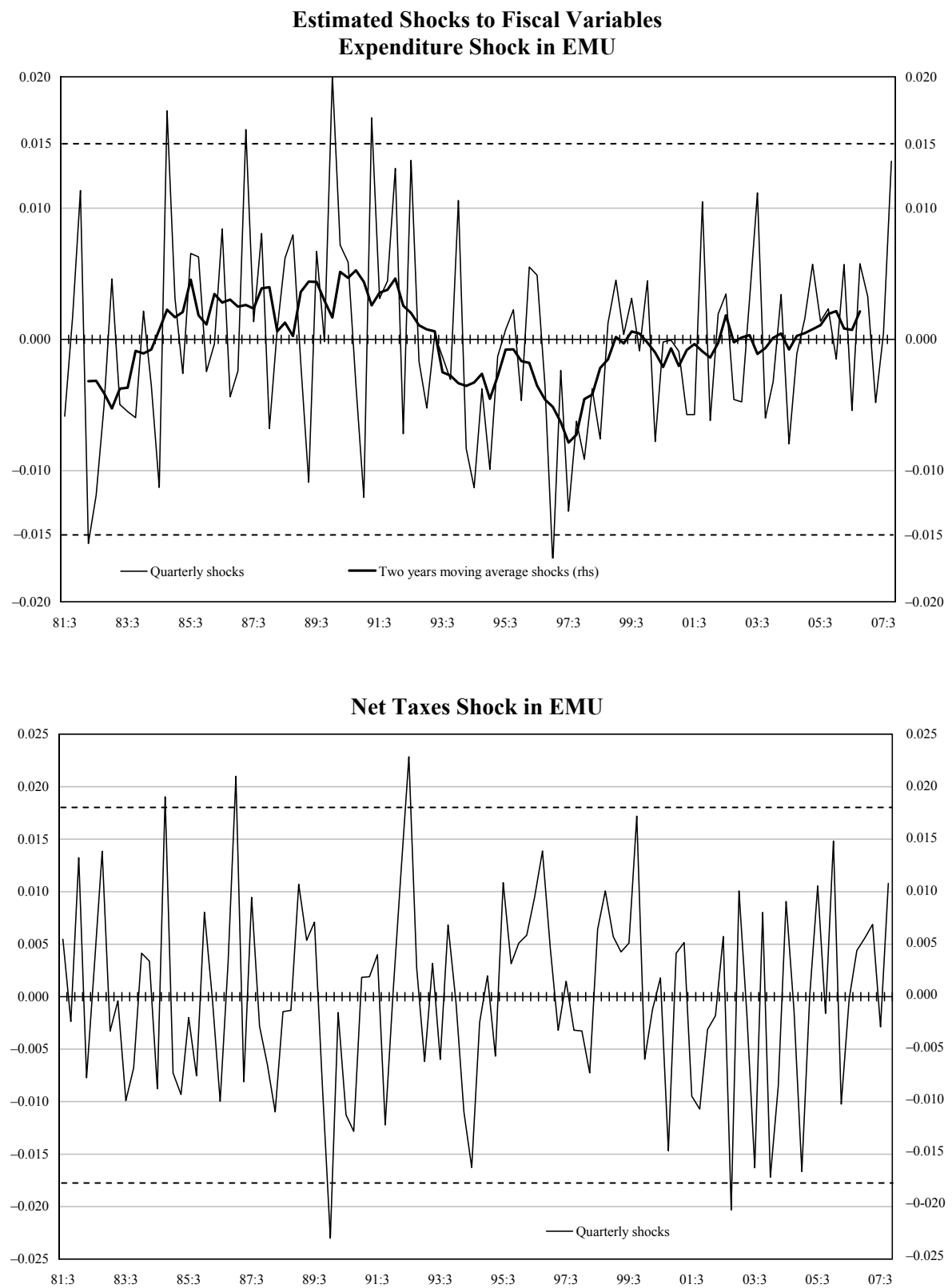
<sup>16</sup> Impulse responses show deviations with respect to the baseline to a one-percent shock of the relevant fiscal variable. Hence, GDP responses cannot be directly interpreted as output multipliers.

<sup>17</sup> Caldara and Kamps (2008) show that, after controlling for differences in the specification of the reduced form model, all identification approaches used in the literature yield qualitatively and quantitatively very similar results for government spending shocks. By contrast, they find strongly diverging results for the effects of tax shocks. These differences stem from differences in the size of the automatic stabilisers estimated or calibrated under alternative identification approaches.

<sup>18</sup> In the literature, the impact of expansionary government spending shocks on interest rates tends to be positive, although rather small (see, for instance, Perotti, 2004).

<sup>19</sup> The cumulative multiplier at a given quarter is obtained as the ratio of the cumulative response of GDP and the cumulative response of government expenditure at that quarter.

Figure 1



The dotted lines frame the one-standard deviation bandwidth.

Figure 2

**Responses to an Increase in Government Spending in EMU**  
(percent)

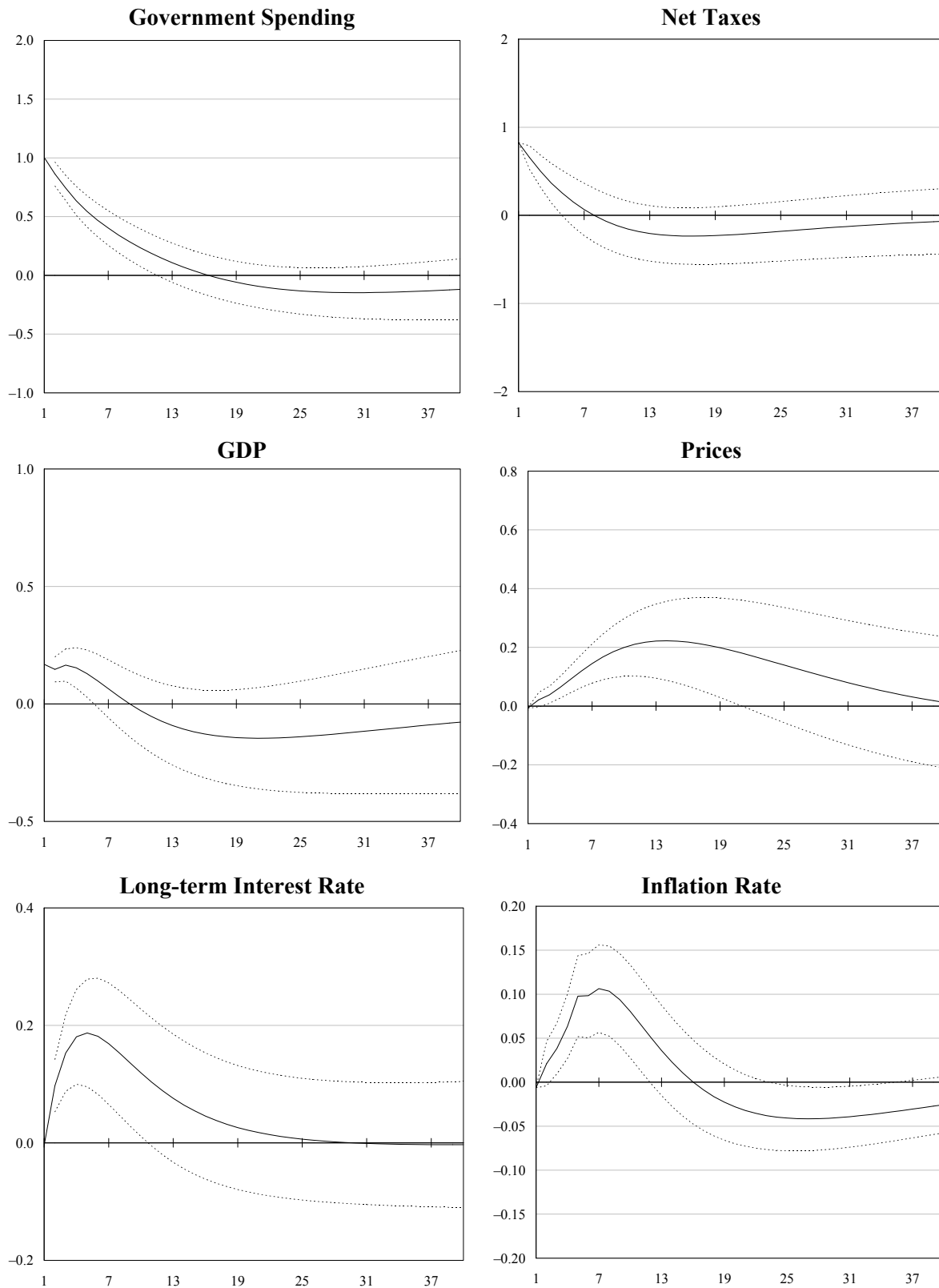


Table 1

## Cumulative Output Multipliers

			Quarters					
			1	4	8	12	16	20
EMU	81-07	Government spending	0.75*	0.87*	0.85*	0.61	0.26	0.02
		Net taxes	-0.79*	-0.63*	-0.49	-0.49	-0.58	-0.74

Note: The asterisks indicate significance within the one-standard deviation bandwidth.

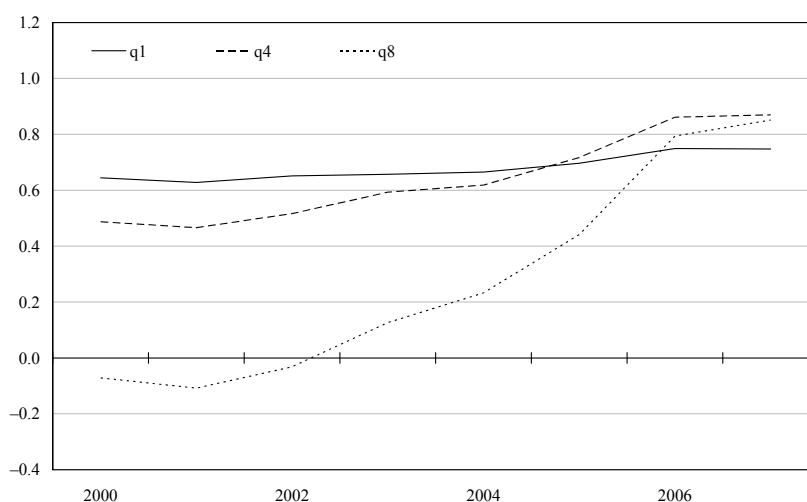
becoming non-significant from the third year onwards. Such low multipliers are indicative of sizeable crowding-out effects.

On the other hand, our output multipliers are significantly larger than those reported in Perotti (2004) for the US, using a sample covering the period 1980-2000. However, if our sample period is restricted until 2000, we obtain multipliers for the EMU very similar to those obtained by Perotti. Thus, our larger output multipliers seem to be due to what has happened between 2000 and 2007. Actually, Figure 3 shows that recursive output multipliers have increased steadily since 2000, especially at the 4<sup>th</sup> and 8<sup>th</sup> quarters after the shock. The cause of this result may be related to the “global saving glut” which might have caused a decrease in global risks premia, diminishing the crowding-out effects of fiscal policy on private investment.<sup>20</sup> However, this fact remains an open question that might deserve further research in the future.

The responses to net-tax shocks are depicted in Figure 4. Specifically, GDP falls on impact in response to net-tax increases in the EMU, but the GDP response remains significant for only three quarters. Likewise, prices, and consequently inflation, fall in the quarters following the shock, presumably due to lower demand pressures, and interest rates fall on impact, although the response become non-significant three quarters after the shock. Finally, government expenditure eventually falls. In turn,

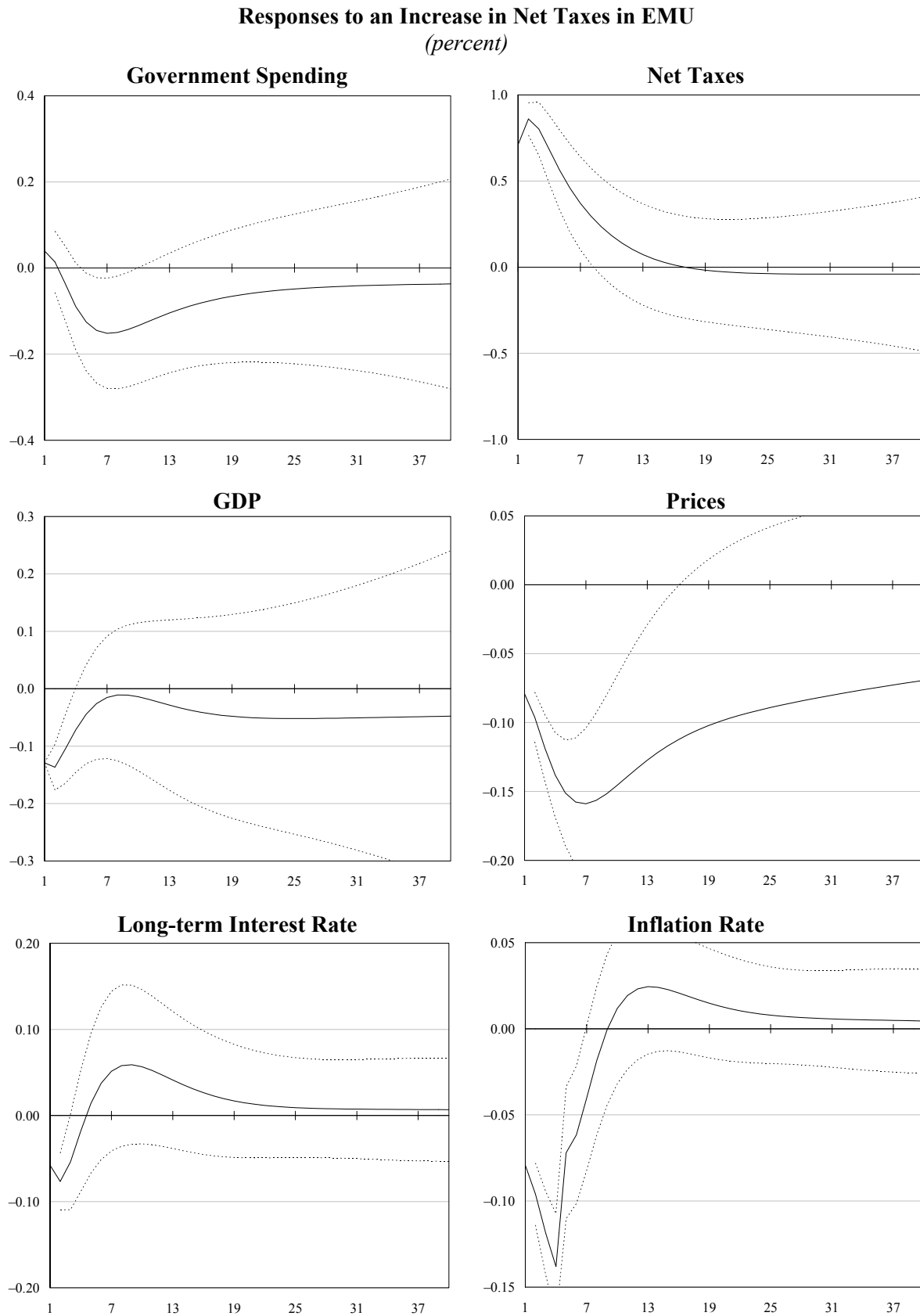
Figure 3

## Recursive Output Multipliers to Government Spending Shocks in EMU



<sup>20</sup> Laubach (2009) analyses the effects of public deficits and debt on interest rates and finds that the relationship between deficits and interest rates turns from positive to negative in the period after 1999:Q1.



**Figure 4**

output multipliers turn out to be negative and lower in absolute value than government spending output multipliers when significant (see again Table 1).

As in the case of spending shocks, these results are qualitatively similar to the findings in previous studies. In general, many empirical papers find that tax multipliers are lower than spending ones in the short-term, which is consistent with the theoretical prediction that part of the higher disposable income stemming from tax cuts is saved. This is the case in Blanchard and Perotti (2002) and Mountfourd and Uhlig (2009). However, some evidence suggests that in the longer term tax multipliers could be higher than spending multipliers. Additional changes in the model specification, alternative variables and a broader sensitivity analysis of the results can be found in Burriel *et al.* (2010).

## 5 Conclusions

This paper contributes to previous literature analysing the effects of fiscal policy for the euro area as a whole, employing a new database that contains quarterly fiscal variables.

In line with previous evidence, we find that GDP and inflation increase in response to government spending shocks, although output multipliers are below unity. However, we provide evidence of output multipliers increasing steadily after 2000 in the EMU, possibly related to the “global saving glut”. In turn, net-tax increases weight on economic activity, with the negative response being short-lived. In line with previous studies, we find that tax multipliers are lower than spending ones in the short-term.

## APPENDIX A CONSTRUCTION OF OUTPUT AND PRICE ELASTICITIES

In order to calculate the output and price elasticities we basically follow the OECD methodology proposed in Giorno *et al.* (1995), which focuses on four tax categories, *i.e.* personal income tax, corporate income tax, indirect taxes and social security contributions. In addition, they consider the elasticity of transfer programmes, notably unemployment benefits. On this issue, in more general terms see Golinelli and Momigliano (2009) for a survey of the cyclical response of fiscal policies.

According to this methodology, the output elasticity of the personal income tax can be obtained as:

$$\varepsilon_{dirh,y} = (\varepsilon_{dirh,w} \varepsilon_{w,emp} + 1) \varepsilon_{emp,y} \quad (6)$$

where  $\varepsilon_{dirh,w}$  is the elasticity of personal income tax revenues to earnings, measured by the compensation per employee,  $\varepsilon_{w,emp}$  is the employment elasticity of the real wage and  $\varepsilon_{emp,y}$  the GDP elasticity of employment. Analogously, the output elasticity of social security contributions is:

$$\varepsilon_{ss,y} = (\varepsilon_{ss,w} \varepsilon_{w,emp} + 1) \varepsilon_{emp,y} \quad (7)$$

with  $\varepsilon_{ss,w}$  being the elasticity of social contributions to earnings.

The output elasticity of corporate income tax revenues stems from:

$$\varepsilon_{dirc,y} = \varepsilon_{dirc,gos} \varepsilon_{gos,y} \quad (8)$$

where  $\varepsilon_{dirc,gos}$  is the elasticity of tax revenues to the gross operating surplus and  $\varepsilon_{gos,y}$  the output elasticity of the gross operating surplus. In the same fashion, given that the main tax base for indirect tax collections is private consumption, the output elasticity of indirect taxes is obtained as:

$$\varepsilon_{tind,y} = \varepsilon_{tind,c} \varepsilon_{c,y} \quad (9)$$

where  $\varepsilon_{tind,c}$  and  $\varepsilon_{c,y}$  are the private consumption elasticity of indirect taxes and the output elasticity of private consumption, respectively.

Since we employ data on a national accounts basis, collection lags should not affect the elasticities to the respective tax-bases significantly. Hence, these have been taken from Van den Noord (2000) and Bouthevillain *et al.* (2001). The output elasticities of the relevant tax bases were, however, obtained from econometric estimation on a quarterly basis. In general, the general equation used for estimating these elasticities was:

$$\Delta \ln(B_t^i) = \gamma + \varepsilon_i \Delta \ln(Y_t) + \eta_t \quad (10)$$

where  $B^i$  is the relevant tax base for the  $i^{\text{th}}$  tax category and  $\varepsilon_i$  is the output elasticity of such tax base. These equations, given the likely contemporaneous correlation between the independent variable and the error term, were estimated by instrumental variables. However, if the variables  $B^i$  and  $Y$  are cointegrated, equation (10) contains a specification error. In this case, the following ECM specification would be preferable:

Table 2

## Output and Price Elasticities of Net Taxes

	EMU
$\varepsilon_{tdirh,w}$	2.0
$\varepsilon_{w,emp}$	0.65
$\varepsilon_{emp,y}$	0.39
$\varepsilon_{ss,w}$	1.0
$\varepsilon_{tdirc,gos}$	1.0
$\varepsilon_{gos,y}$	1.08
$\varepsilon_{c,y}$	0.97
$\varepsilon_{ind,c}$	1.0
<b>Output Elasticities</b>	
$\varepsilon_{tdirh,y}$	0.90
$\varepsilon_{ss,y}$	0.64
$\varepsilon_{tdirc,y}$	1.08
$\varepsilon_{ind,y}$	0.97
$\varepsilon_{transf,y}$	-0.2
$\varepsilon_{t,y}$	<b>1.54</b>
<b>Price Elasticities</b>	
$\varepsilon_{tdir,p}$	1.0
$\varepsilon_{ss,p}$	0.0
$\varepsilon_{ind,p}$	0.0
$\varepsilon_{transf,p}$	-1.0
$\varepsilon_{t,p}$	<b>1.14</b>

$$\Delta \ln(B_t^i) = \gamma + \mu(\ln(B_{t-1}^i) - \lambda \ln(Y_{t-1}) - \phi) + \varepsilon_i \Delta \ln(Y_t) + \sum_{j=1}^k \varphi_j \Delta \ln(Y_{t-j}) + \sum_{j=1}^k \nu_j \Delta \ln(B_{t-j}^i) + \eta_t \quad (11)$$

where  $\lambda$  measures the long-term contemporaneous elasticity we are interested in.

Information on the output elasticity of net transfers is more limited than in the former cases. Although unemployment benefits respond to the underlying economic conditions, many expenditure programmes do not have built-in conditions that make them respond contemporaneously to employment or output. Therefore, recalling Perotti's argument, an output elasticity of net transfers of -0.2 has been assumed.

As for price elasticities, following van der Noord (2000) the elasticity of direct taxes paid by households, corporate income taxes and social contributions were obtained as  $\varepsilon_{tdirh,p} = \varepsilon_{tdirh,w} - 1$  (yielding 0.9),  $\varepsilon_{tdirc,p} = \varepsilon_{tdirc,gos} - 1$  (with a value equal to 0) and  $\varepsilon_{ss,p} = \varepsilon_{ss,w} - 1$  (being -0.1), respectively. Indirect taxes are typically proportional. Hence, following Perotti (2004), a zero price elasticity was assumed. Finally, although transfer programmes are indexed to the CPI, indexation occurs with a considerable lag. Thus, the price elasticity of transfers was set to -1. Table 2 shows the resulting output and price elasticities.

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# THE CRISIS, AUTOMATIC STABILISATION, AND THE STABILITY PACT

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*This paper describes recent trends on the effectiveness of stabilisers in the European Union. Using both macro evidence on the cyclical sensitivity of budget deficit to economic activity and micro evidence on the tax and expenditure profiles, we conclude, in agreement with the recent literature, that the importance of automatic stabilisation has decreased. After remarking that this trend is contradictory with the current economic institutions of Europe, which rely exclusively on automatic stabilisation for the conduct of fiscal policy, we argue that increasing flexibility, one alternative way to reduce cyclical fluctuations, does not seem a viable path. The paper concludes defending the appropriateness of discretionary fiscal policy. We argue by means of a simple model that the theoretical arguments against its use are not conclusive, and we describe a recent stream of literature, based on structural VAR models, that concludes rather robustly for the effectiveness of discretionary fiscal policy in the short and long run.*

## 1 Introduction

The recent economic crisis and financial turmoil had an unexpected consequence: fiscal policies, for a longtime banned from the policymaker toolbox following the conclusions of the New Classical Macroeconomics (NCM) School, have been praised for their capacity to sustain aggregate demand and to dampen the cycle (Arestis and Fontana, 2009).

Though fiscal policies have gained legitimacy in the policymaking sphere, the NCM influence remains present, for example because it is still embedded in the European Stability and Growth Pact. Due to large swings in public deficits and debts, European institutions, like governments, the European Commission and the European Central Bank, are beginning to call for a reversal of fiscal stances in order to gain credibility and have public deficits converge below the 3 per cent of GDP threshold. The underlying message is simple: deficits have grown in bad times, through the full play of automatic stabilisers and the implementation of fiscal stimulus packages. Provided good times are coming back, a symmetric evolution of deficits is required, through automatic stabilisers, still, and fiscal contractions.

The underlying analysis seems reasonable, but under specific assumptions that need to pass a comprehensive empirical test. Among these assumptions, one of the most dramatic is surely the one related to the full play of automatic stabilisers. For well-known political economy mechanisms, it is easier to have deficits reduced automatically than through a political inertial process that is generally not prone to encompassing the academic ideas of reducing the scope of governments (the ratchet effect argument). Were automatic stabilisers strong, then smaller fiscal packages would be required to counter a given shock like the current crisis; more importantly, on one side it would be easier to bring back deficit and debt under control, and on the other the requirement for reducing the scope of governments after the crisis is over would also be smaller.

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As a consequence, in order to assess the consistency of the current thinking on EU fiscal policies, it is important to review the level, evolution over time and effectiveness of automatic stabilisers in the EU. A strong or increasing role for automatic stabilisers in the EU would reinforce the current arguments about exit strategies and the necessity of a fast reduction of public deficits. If the opposite were true, an inconsistency would emerge, between the severeness of the crisis and the call for a quick reversal of discretionary fiscal policies. Our paper aims at shedding light on this issue.

If automatic stabilization does not (or no longer) suffice to ensure macroeconomic stabilization, there may be the need to bring discretionary policies to the foreground. The second objective of this paper is thus to provide a summary of the recent debate, both from a theoretical and an empirical viewpoint.

In fact, if it were to be concluded that discretionary fiscal stances are detrimental to macroeconomic stability, it seems reasonable to favour a quick reversal of the current fiscal stimulus policies. Thus we give an assessment of the effects of fiscal policy on GDP. First, we discuss the effectiveness of discretionary fiscal policies as a growth-enhancing factor; second, we assess the actual ability of the Stability and Growth Pact to enhance macroeconomic stability.

The rest of the paper is organised as follows. Part 2 provides a reduced-form model that helps shedding light on the precise and crucial assumptions for fiscal policy to entail non-Keynesian effects. Part 3 reviews and discusses different approaches to estimating the scope and effectiveness of automatic stabilisers. Part 4 turns to the question of macroeconomic stability and presents estimations of the cyclical components of real GDP for the euro area for a different set of frequency bands. Part 5 concludes on the pros and cons of going beyond automatic stabilisers *via* discretionary fiscal policies.

## **2 Preliminary thoughts about non-Keynesian effects of fiscal policy**

The economic institutions of Economic and Monetary Union in their actual design stem from two main sources. The first is the founding Treaty signed in Maastricht in 1991, and the second is the Amsterdam Treaty of 1997, that completed the setup with the Stability and Growth Pact (hereafter SGP).

The Maastricht Treaty defined the convergence criteria that countries had to fulfil in order to be admitted to the single currency area. In particular, it required a deficit to GDP ratio of no more than 3 per cent, and a public debt below 60 per cent of GDP, or approaching that level at a satisfactory pace.

The Amsterdam Treaty contains further provisions regarding fiscal policy that have the objective of increasing transparency and control on public finances. The Stability and Convergence Programmes that each year Member States present to the Commission have to contain a medium-term objective for the budgetary position of close to balance or in surplus, together with an account of the adjustment path towards the objective. The Excessive Deficit Procedure states what deviations from the 3 per cent budget deficit ceiling are acceptable and describes the sanctions for the violators. As of March 2010, no country has been fined, although disapproval of budget positions in some countries has been expressed, and the current crisis in Greece is highlighting the powerful effect of the SGP as a peer-pressure instrument.

The prolonged period of low growth experienced by most Euro area countries (especially the largest ones), and the increasing number of countries struggling to maintain their deficits within the limits set by the Stability and Growth Pact (SGP), have triggered a debate on the flaws of the current fiscal framework, and on possible reforms aimed at a better functioning of fiscal policy in



Europe.<sup>1</sup> The reform adopted by the European Council in March 2005 relaxes somewhat the medium term objective of a zero structural deficit for countries with low debt and/or with high potential growth; furthermore, it contemplates a number of circumstances (e.g., a strong engagement in costly structural reforms) allowing temporary deviations from the deficit ceiling, and longer delays for correcting them.

The requirement to attain a position of close to balance or surplus in the medium term is an important innovation of the SGP with respect to the Maastricht Treaty, and it was left substantially unchanged by the reform of 2005. In fact, it implies the strong consequence that public debt as a ratio to GDP should tend asymptotically to zero, a position hard to justify *per se* (de Grauwe, 2003).

Even after the reform of 2005, the focus of the Stability and Growth Pact has been on the full operation of automatic stabilisers which would allow the implementation of a counter-cyclical short run fiscal policy. However, recent assessments of fiscal policies in the EU-15 have either pointed to their a-cyclical (Galí and Perotti, 2003) or to their pro-cyclical (Farina and Ricciuti, 2006). This raises doubts about the effectiveness of automatic stabilisers all over Europe.

Before turning to an evaluation of this latter point, it is worth recognising that the EU fiscal framework is based upon an unfriendly view of fiscal policy that largely stems from the New Classical Macroeconomics. Under the assumption of perfect sighted households and firms, the effects of fiscal policy are consistent with the so-called Ricardian approach *à la* Barro (1974). Consequently, higher (lower) deficits produce higher (lower) private savings and lower (higher) consumption that may more than compensate the effect increase (decrease) of public demand. This mechanism, according to Giavazzi and Pagano (1990), explained why fiscal contractions in Denmark and Ireland proved expansionary. Bertola and Drazen (1993) and Sutherland (1997) developed theoretical models with non-linearities in the consumption function that led to non-Keynesian effects of fiscal policy.

It may be useful then, to better understand the conditions under which non Keynesian effects may appear. A very simple model allows to show that a crucial role is played by public spending irresponsibility and very few liquidity-constrained households.

Take an economy in which a proportion  $\mu$  of households are liquidity constrained. As in Hayashi (1982) and Campbell and Mankiw (1990), liquidity-constrained individuals cannot borrow or lend, so that they consume all their disposable income in each period. The economy lasts 2 periods. During the first, labelled “Keynesian”, demand drives production, while during the second, labelled “Classical”, the contrary holds. Assuming there is no investment, the usual demand equations give:

$$y_1 = c_1 + G_1 \quad (1)$$

$$y_2 = \bar{y} \quad (2)$$

where subscripts refer to time periods,  $y$  is production or demand,  $c$  is private consumption and  $G$  are public expenditures.

Unconstrained individuals smooth consumption over their entire horizon: their consumption depends on their permanent income. They maximise their intertemporal utility function subject to the usual intertemporal budget constraint:

<sup>1</sup> For detailed accounts of the debate on reforming the Pact, see, e.g., Arestis *et al.* (2001); Buti *et al.* (2003); Farina and Tamborini (2007); and Fitoussi and Le Cacheux (2007).

$$\begin{aligned} \text{Max } u &= \ln(c_1) + \beta \ln(c_2) \\ \text{s.t. } c_1 + c_2 &= R \end{aligned}$$

where  $R = y_1 + y_2 - (T_1 + T_2)$  is lifetime income, defined as the sum of disposable incomes,  $\beta$  is the discount factor, and  $T$  is total taxes on individuals. To simplify the exposition and without loss of generality, a zero interest rate on savings and a constant intertemporal price of consumption are assumed. Under perfect foresight, the solution gives:

$$\begin{aligned} c_1 &= \frac{1}{1+\beta} R \\ c_2 &= \frac{\beta}{1+\beta} R \end{aligned} \quad (3)$$

Aggregate consumption of liquidity-constrained and unconstrained individuals in period 1 can thus be written as:

$$c_1 = \mu(y_1 - T_1) + (1-\mu) \frac{1}{1+\beta} R \quad (4)$$

The government has an intertemporal budget constraint (BC):

$$B_0 + G_1 + G_2 = T_1 + T_2 \quad (5)$$

where  $B_0$  represents the initial level of public debt in the economy.

Following Perotti (1999), present and future public expenditures are assumed to be correlated, *i.e.* to follow an inertial process whose strength depends on the value of a “stickiness” parameter  $\rho$ :

$$G_2 = \bar{G} + \rho G_1 \quad (6)$$

where  $\bar{G}$  are discretionary expenditures in period 2.

Defining  $B_0 + \bar{G} = \Gamma$ , the BC becomes:

$$\Gamma + (1+\rho)G_1 = T_1 + T_2 \quad (7)$$

Substituting (4) in (1) gives:

$$\begin{aligned} y_1 &= G_1 + \mu(y_1 - T_1) + \frac{(1-\mu)}{1+\beta} (y_1 + y_2 - \Gamma - (1+\rho)G_1) \\ &= \frac{\beta + \mu - \rho(1-\mu)}{\beta(1-\mu)} G_1 - \mu \frac{1+\beta}{\beta(1-\mu)} T_1 + \frac{1}{\beta} (y_2 - \Gamma) \end{aligned} \quad (8)$$

from which the multiplier effect of public spending on short-run GDP can be computed:

$\frac{\partial y_1}{\partial G_1} < 0 \Leftrightarrow \rho(1-\mu) > \beta + \mu$ . It is then straightforward to show that non-Keynesian (NK) effects occur if and only if:

$$\mu < \frac{\rho - \beta}{1 + \rho} \quad (9)$$

Assume for the time being that no household is liquidity constrained ( $\mu=0$ ). In that case, the necessary and sufficient condition to satisfy inequality (9) is  $\rho > \beta$ . Intuitively, in this simplified framework, if an increase in expenditure today is perceived as permanent (high  $\rho$ ), and consumers are not patient enough (low  $\beta$ ), then  $G$  crowds out private expenditure and has negative effects on income. NK effects would thus appear if the degree of persistence of fiscal policy is larger than the discount factor: long-lasting expenditure cuts would improve permanent income as individuals would expect lower taxes in period 2. If some households are liquidity constrained ( $\mu > 0$ ), then the condition  $\rho > \beta$  is necessary but not sufficient, as a number of households are unable to smooth consumption over periods. There are a number of reasons for considering that condition (9) is not likely to be met. First, it is really tricky to obtain: with a share of liquidity-constrained households ( $\mu$ ) equal to one third, and a discount factor ( $\beta$ ) equal to 0.95, the degree of persistence in public expenditures necessary to yield NK effect would have to be extremely high ( $\rho \geq 1.95$ ), *i.e.*, we would need to assume that government expenditure follows an explosive path, and that the model diverges from the steady state. More in general, as the fraction of liquidity-constrained agents increases, the area of NK effects decreases, so that assuming NK effects is equivalent to assuming the existence of a large enough number of Ricardian consumers; however, the empirical validity of the second assumption is very disputable (see Ricciuti, 2003, for an assessment and survey of the literature).

If NK effects emerge as the exception rather than the rule, especially when the proportion of liquidity constrained individuals is large and increasing, fiscal policy becomes a tool available for smoothing economic fluctuations. Because of the design of European fiscal institutions, automatic stabilization, is particularly important, through its direct incidence on disposable income and through increased social expenditure.

### 3 About the effectiveness of automatic stabilisers in the EU

The current crisis, and the subsequent increase in the number of liquidity constrained households and firms, has renewed interest in automatic stabilizers; this is evident from the number of recent papers devoted to this topic in the very recent past, that contrast with the relative neglect of the previous decade. Still today, the number of published articles is very limited.<sup>2</sup>

Afonso and Furceri (2008) are critical on the strength of automatic stabilizers in the Euro area and the EU-15. Crespo Cuaresma *et al.* (2009) study the smoothing impact of EU automatic stabilizers and call for a full account not only of the variation but also of the level of government size in order to better assess the non-linearities in this smoothing impact. Both papers endorse a panel data methodology and limit automatic stabilizers to the usual five elements of the government budget: household direct taxes, business direct taxes, social security contributions, indirect taxes and unemployment compensation (see Giorno *et al.*, 1995 and Van den Noord, 2000). These are then studied independently.

In contrast, Darby and Mélitz (2008) enlarge the definition of automatic stabilizers. They depart from the usual taxonomy as they extend the analysis to a wider set of public spending: they show that age- and health-related social expenditures and incapacity benefits have a role to play as automatic stabilizers: they also help to cushion the business cycle. Though Darby and Mélitz

<sup>2</sup> A quick search of “automatic stabilisers” or “automatic stabilizers” in the abstract of “journal articles” under EconLit leaves us with 72 articles; as a matter of comparison, searching for “inflation target” gives 726 results over the same period.

helped to renew interest for automatic stabilizers, they do not investigate their changing strength over time since the euro has been adopted. They split their sample in 1992, before the convergence process began in the EU.

From earlier literature, a consensus emerged on fiscal policy, which has to be limited to automatic stabilisation, banning discretionary intervention from the toolbox of policy interventions. The standard argument maintains that the limit of total deficit to 3 per cent, coupled with the requirement of structural balance, could avoid fiscal indiscipline (thus protecting central bank independence, and ensuring fiscal sustainability), while letting enough room for automatic stabilisation to take care of country specific shocks (see, e.g., Brunila *et al.*, 2002). Nevertheless, some empirical studies (see, e.g., Barrell and Pina, 2004) pointed to the fact that the initial levels of debt-to-GDP ratios and cyclically-adjusted deficits in some Euro area Member States might have been too high on the wake of adopting the euro to permit the automatic stabilisers to operate freely within the constraints of the SGP.

It is well-known that the effectiveness of automatic stabilisers depends on the sensitivity of government revenues and spending to economic fluctuations and on the sensitivity of economic activity to cyclical changes in government revenues and spending. Among the factors affecting budgetary sensitivity, the literature highlights the size of the public sector, the progressivity of the tax and benefit system, the sensitivity of tax bases to economic fluctuations, the institutional time profile of the tax system,<sup>3</sup> the level of unemployment benefits and the sensitivity of unemployment to fluctuations in economic activity. Other factors, such as the nature and size of shocks, have an influence on the effectiveness of automatic stabilisers. Finally, the overall flexibility of the economy may also dampen the shocks; that may in turn overstate the effectiveness of automatic stabilisers.

In the following, we review the evolution of these different factors over time, distinguishing the macro evidence from the micro evidence on the effectiveness of automatic stabilisers in the EU since the adoption of the euro.

### 3.1 Automatic stabilisers: macro evidence

We begin with a summary, in Table 1, of the main conclusions of different well known macroeconometric models that estimate the percentage of fluctuations in output which are smoothed by automatic stabilisers. We also report recent estimations of the smoothing contribution of automatic stabilisers by OECD economists. Though some models have been recently updated (for example, the QUEST model of the Commission), it has not been possible to find updates of estimates of the smoothing national properties of automatic stabilisers.

The most striking result is the heterogeneity among countries in terms of the sensitivity of economic activity to the cyclical changes in government revenue and spending. The standard error of business cycle smoothing through automatic stabilization across countries goes from 2 to 8 per cent, for an average of 19 per cent across models and countries. Moreover, the extent of smoothing for a country is quite different from one model to the other and the standard errors across models are large, ranging from 6 per cent for Germany to 12 per cent for the Netherlands. In spite of these discrepancies, which stem from the different model properties (the early inclusion of Ricardian consumers in NiGEM explains why the smoothing contribution is so small), overall, Table 1 shows that the scope of automatic stabilisers in the EU is low: at best, they smoothed a

<sup>3</sup> By this we mean that automatic stabilisers are more effective if, e.g., main tax revenues come from taxes which are very sensitive to economic fluctuations and whose lags are short. For example, corporate taxes are generally very sensitive to the economic cycle but delays in collection reduce the overall effectiveness of this tax as a prominent automatic stabiliser.

**Table 1**

**Effectiveness of Automatic Stabilisers Across EU Countries**  
(percent)

	<b>Bundesbank Model</b>	<b>QUEST Model</b>	<b>NiGEM Model</b>	<b>INTERLINK Model</b>
	(1)	(2)	(3)	(4)
France	19	23	7	14
Italy	14	21	5	23
Netherlands	14	20	6	36
United Kingdom	24	18	n.a.	30
Germany	23	17	18	31
Unweighted average	18.8	19.8	9.0	26.8
Std error	4.8	2.4	6.1	8.5

Note: percentage of fluctuations in output which are smoothed by automatic stabilisers.

Sources: (1) Scharnagl and Tödter (2004); (2) European Commission (2001); Barrel and Pina (2004); Van den Noord (2000).

maximum of 36 per cent of economic fluctuations and at worst only 5 per cent of them. This latter outcome is definitely consistent with Afonso and Furceri (2008) recent EU estimates with panel data: between 1980 and 2005 economic smoothing by social contributions and social benefits is close to 5 per cent, and to 7 per cent respectively. Moreover, the authors do not find a substantial change in economic smoothing once they limit the sample to more recent years.

Drawing on estimations by Blix (2008), it can be shown that the average cyclical sensitivity of public expenditures to a 1 percentage change in the output gap in EU countries is low (−0.2) and varies much across the sample of countries (standard error equal to 0.2). It comes that the homogeneity of fiscal rules at the level of countries in the EU is contradictory with the heterogeneity of empirical rules since the 1980s.

To summarize, there is evidence that the sensitivity of economic activity to cyclical changes in government revenues and spending has been rather low. If the macro effectiveness of automatic stabilisers is dubious, what about the efficiency of automatic stabilisers viewed as the sensitivity of government revenues and spending to economic fluctuations?

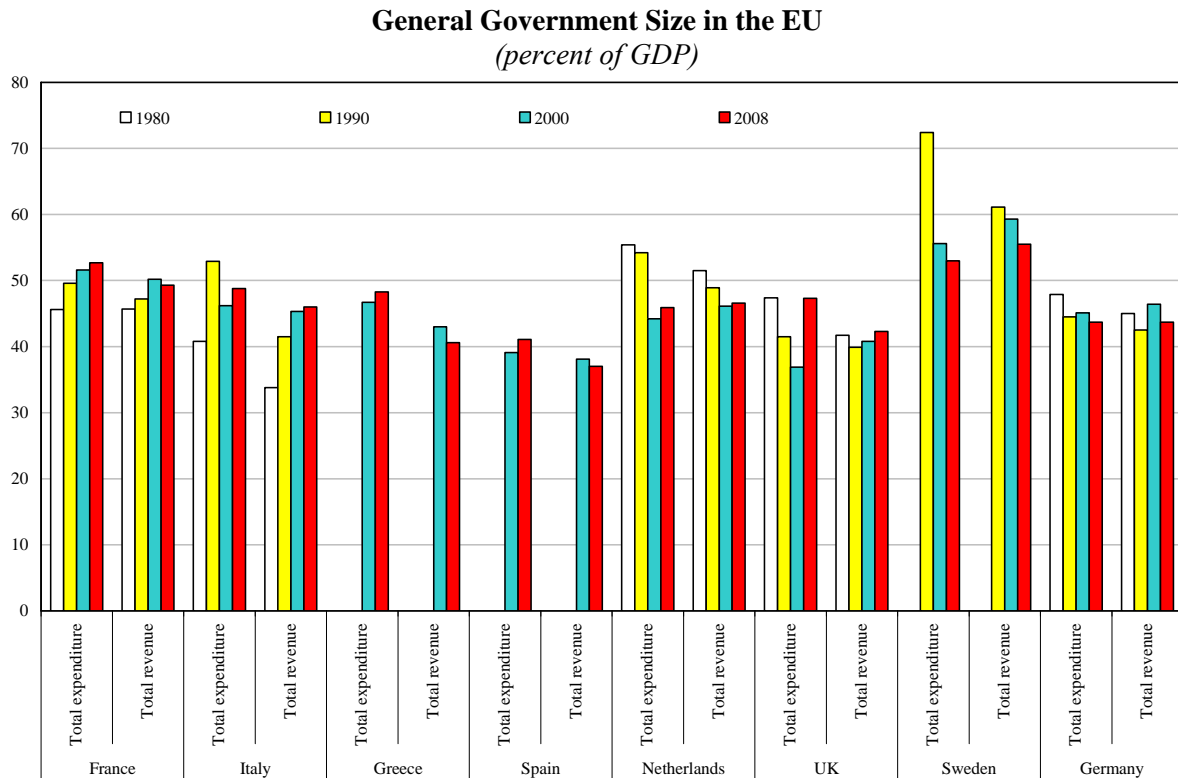
### *3.2 Recent changes in revenue and expenditure trends: Micro evidence*

It was recalled earlier that the full working of automatic stabilisers rests predominantly on the size of the public sector, on the structure of the tax and benefit systems and on the level of unemployment benefits and their sensitivity to economic fluctuations. The evolution of these factors is described in the next subsections.

#### *3.2.1 The size of the public sector*

Since the seminal paper of Galí (1994), there have been many attempts to link the size of

Figure 1



Source: Eurostat.

governments, using either the levels of expenditures or tax receipts, to output volatility/stability. Galí opted for a cross-country study involving only tax receipts, whereas Van den Noord (2000) used public spending. Both showed that higher government size corresponds to lower output volatility.

Using a sample of 20 OECD countries, Fatás and Mihov (2001) also showed that government size and the volatility of the business cycle were negatively correlated; they concluded that larger governments had more effective automatic stabilisers. Government size was measured by the ratio of public expenditures or tax revenues to GDP. Lee and Sung (2007) confirmed earlier results by Fatás and Mihov (2001), though they improved the methodology, using IV empirical techniques and making a distinction amongst public spending. Debrun *et al.* (2008) found out that above a threshold level of public spending, the effectiveness of automatic stabilisers was sharply reduced. They also pointed to a decrease in effectiveness since the 1990s.

Figure 1 displays the level and evolution of government size in eight EU countries. Three groups of countries emerge with one outlier. The Netherlands, Sweden and Germany have reduced the size of their governments, in terms of revenues and expenditures, whereas France and Italy have rather increased it. Greece and Spain, over a shorter sample, constitute a third group in which spending has increased whereas tax receipts have been reduced. The UK is the outlier: until 2006, this country joined the first group, but the financial turmoil has been so dramatic that public spending (over GDP) has recently sharply increased. This evolution stands in sharp contrast with what had happened since the 1980s. For the countries of the first and, to a lesser extent, the third

Table 2

**Reduction of Interdecile Inequality After Fiscal and Social Transfers**  
(percent)

Country	D5/D1		D10/D5	
	1998	2001**	1998	2001**
EU-15*	-43.7	-42.0	-31.1	-32.4
France	-40.1	-37.6	-29.0	-29.4
Germany	-59.5	-66.5	-30.4	-34.1
Italy	-16.7	-17.2	-25.7	-28.7
Netherlands	-59.3	-57.0	-28.1	-23.4
Spain	-27.9	-29.1	-41.2	-34.6
Ireland	-91.7	-90.2	-33.0	-41.7
United Kingdom*	-76.4	-78.5	-35.1	-35.5

\* indicates XXX euros adjusted for PPP.

\*\* indicates the year 2003 for Germany, the Netherlands and UK; 2005 for Spain.

Sources: EUROMOD statistics on Distribution and Decomposition of Disposable Income, accessed at: [www.iser.essex.ac.uk/msu/emodstats/DecompStats.pdf](http://www.iser.essex.ac.uk/msu/emodstats/DecompStats.pdf) on 1998 and 2001 (2003, or 2005) using EUROMOD version 31A; computations by the authors.

group, and following Fatás and Mihov (2001), it can be concluded that automatic stabilisers are now less effective than in the past. An opposite conclusion holds for France and Italy. On average, total expenditures and total revenues have decreased since the 1990s. As for the discrepancy across EU countries, when measured by the standard error of cross-country public spending, it was at its lowest in 2008 (4.1 per cent), in comparison with 11 and 6 per cent in 1990 and 2000 respectively: there has been strikingly more homogeneity in government spending in the EU than in the past, and a time when the size of governments was on average on a downward trend. The same conclusion holds for total revenues.

### 3.2.2 The progressivity of the tax and benefit system

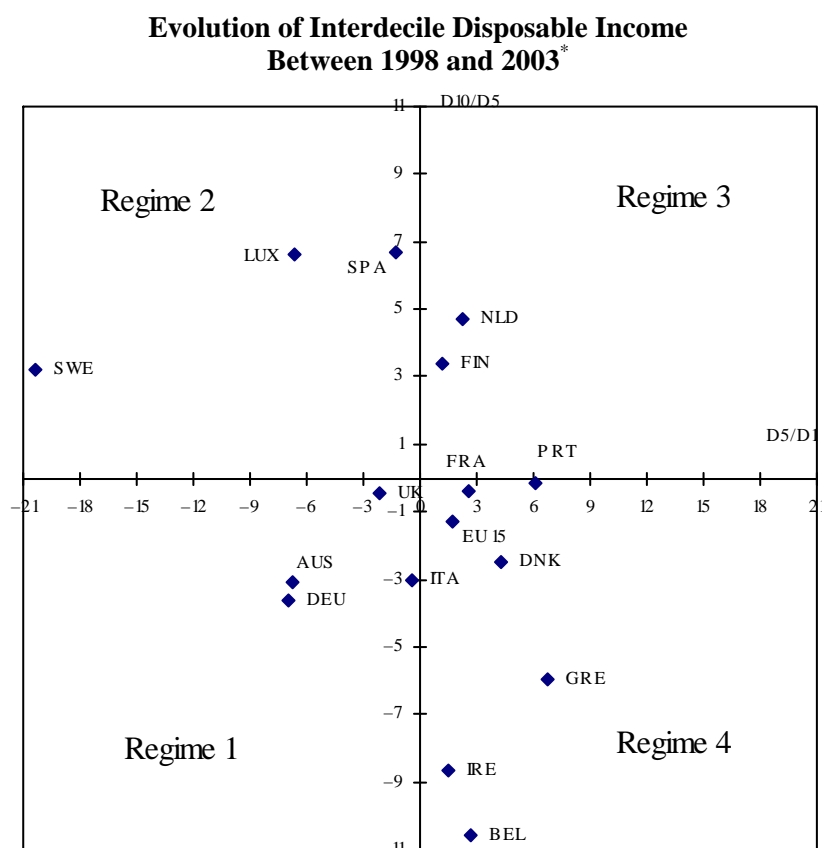
Since the end of the 1990s, there has been a sharp modification in the tax and benefit systems of the EU-15 countries: In many of them the redistributive role of the system<sup>4</sup> has been attenuated, while at the same time top marginal tax rates were reduced.

Aggregate data at the EU-15 level tell a mixed story. Between 1998 and 2001 (comparable data are not available for other years), the distribution of disposable income<sup>5</sup> remained constant, the three first deciles receiving 14 per cent of total disposable income, the next four 35 per cent, and the highest income groups more than 50 per cent. A comparison of interdecile ratios for disposable and pre-tax incomes shows instead a change between 1998 and 2001: Table 2 shows that the

<sup>4</sup> A redistributive system is viewed as a system improving the situation of the households earning the lowest income, on the one hand; and making the households earning the highest income contribute more to welfare and social expenditure, on the other hand.

<sup>5</sup> Disposable income is original income (from employment, investment, private pension) minus taxes plus received benefits, from maternity allowances to public pensions.

Figure 2



Notes: Regime 1: improvement in the two objectives; Regime 2: improvement in objective 1, deterioration in objective 2; Regime 3: deterioration in the two objectives; Regime 4: improvement in objective 2, deterioration in objective 1; Objective 1: reducing inequality for low-income earners; Objective 2: increasing the contribution effort of high-income earners.

\* indicates the year 2001 for Denmark, France, Ireland, Italy and Sweden; 2005 for Greece and Spain.

Source: EUROMOD (see Table 1), computations by the authors.

benefit and tax systems permitted a reduction in inequality between Decile 5 and Decile 1 of 43.7 per cent<sup>6</sup> in 1998, but only of 42.0 per cent in 2001. In the meantime, redistribution between Decile 10 and Decile 5 was more substantial in 2001 than in 1998. As a consequence, the property of the tax and benefit system in the EU taken as a whole to redistribute between the middle income decile and the lowest income decile has not improved between 1998 and 2001, whereas redistribution between the upper decile and the median decile has improved. For the EU, improvement in the redistributive role of the tax and benefit system has gone half way. Except Germany, Italy and the UK, other reported countries in Table 2 reflect an inability to improve both sides of the redistributive role of the system.

Based upon the Euromod statistics, some of which have been updated in 2003 or 2005, we can draw a picture of the evolution of redistributive properties of EU-15 countries since 1998, as shown in Figure 2. Countries are distributed on the graph according to the time profile of the redistributive properties of their tax and benefit system. On the x-axis, a positive (resp. negative) value means that the relative situation of households from Decile 1 has deteriorated (resp. improved) *vis-à-vis* that of Decile 5 between 1998 and 2003.<sup>7</sup> On the y-axis, a positive (resp. negative) value means that the relative situation of households from Decile 5 has deteriorated (resp. improved) *vis-à-vis* that of Decile 10 over the same time span. If the two objectives – improving the situation of the households earning the lowest income, and making the households earning the highest income contribute more to welfare and social expenditure – are reached by a country (we label it Regime 1 and we consider that it is the best performing regime), both values

<sup>6</sup> In 1998, for the EU-15 countries on average, the ratio of Decile 5 to Decile 1 original income was equal to 473 per cent; with disposable income data, it was equal to 266 per cent: thus, a variation of minus 43.7 per cent.

<sup>7</sup> 2001 for Denmark, France, Ireland, Italy and Sweden; 2005 for Greece and Spain.



should be negative. Regime 2 holds when the households with the lowest and highest incomes are better-off at the expense of middle-income earners; Regime 4 holds when the situation of middle-income earners improves *vis-à-vis* the households with the lowest and highest incomes. Last, Regime 3 holds when the situation of the households with the highest income improves *vis-à-vis* low-income and middle-income earners.

Few EU-15 countries have actually reached regime 1 over this short period: only Austria and Germany,<sup>8</sup> and Italy and the UK to a lesser extent, have been able to reduce both types of income inequality since 1998. Six countries (Denmark, France, Ireland, Greece, Belgium, Portugal) are in Regime 4, where the situation of middle-income earners<sup>9</sup> has improved *vis-à-vis* low-income and high-income earners. On the opposite, Luxembourg, Spain, and Sweden have seen the relative situation of the lowest-income earners improve, and substantially so, at the expense of middle-income earners whose relative position with respect to the households earning the highest income decreased (Regime 2). Finland and the Netherlands are in Regime 3, witnessing deterioration in the situations of low-income and middle-income earners, at the benefit of the highest-income earners.

To sum up, countries are quite unevenly distributed across the four regimes and, except in Austria and Germany, the progressivity of the tax and benefit system decreased between 1998 and 2003 and with it, the effectiveness of automatic stabilisers on the side of public receipts.

One can also assess progressivity by looking at marginal income tax rates. Table 3 reports central government marginal tax rates of a few European countries, together with the number of tax brackets. While this measure is only partial (the overall degree of progressivity also depends on the structure of the tax base, on thresholds, exemptions, and so on), the trend is unequivocal. One can easily see that in most countries there was a sharp decrease in both the marginal rate and the number of brackets, going thus towards a less progressive tax system. The complexity of the tax system on the other hand may hide other trends of inframarginal rates and threshold, that may redistribute income towards the very poor, thus implying an increase of average propensities to consume and of multipliers, in spite of the overall decrease of progressivity.<sup>10</sup> The above analysis of interdecile distribution, nevertheless, together with recent studies on the long run evolution of income distribution (CITE IMF OECD), suggests that this possibility is not very realistic.

Table 4 displays corporate tax rates in EU-15 countries. Except in Spain where the change occurred later, corporate tax rates have decreased since 1990 or 2000. The common wisdom maintains that this significant and widespread reduction enhances production, incentives and entrepreneurship. In the short run, lower corporate tax rates may induce higher profitability that may fuel investment and employment. Nevertheless, they may also induce to distribute more profits which may then be invested elsewhere in the world economy and which may be missing for financing domestic social benefit systems. Moreover, if lower corporate taxes do not succeed in fuelling production and growth, the consequent rise in public deficits in Europe may push governments to reduce transfers and other public expenditures; in this sense, lower taxes may have as a side effect the reduction of automatic stabilisation.

Possible tensions on public finances because of lower taxes do not come exclusively from corporate tax rates: taxes on labour incomes have also decreased in the recent past (see OECD, 2006). Only Denmark and, to a lesser extent, Finland, Greece and Sweden, have not witnessed such a decrease. Apart from these countries, tax cuts are general and they may have had a bad influence

<sup>8</sup> Both countries are close to the 45° line for which the improvements in the two objectives are comparable.

<sup>9</sup> The situation of the “middle-class” in these societies is well beyond the scope of this contribution which intends to give some macroeconomic and microeconomic clues on the effectiveness of automatic stabilisers. By “middle-income earners”, we only refer to Decile 5. It is possible that the “middle-class” starts at, say, Decile 4 or 6 and, were it the case, conclusions related to the possible improvement or deterioration *vis-à-vis* the “upper-class” (also to be precisely defined) might be different.

<sup>10</sup> We owe this remark to Richard Hemmings.

Table 3

## Number of Tax Brackets and Marginal Income Tax Rates\*

		1981	1991	2001	2008
Belgium	Number of Brackets	23	7	7	5
	Maximum Rate	72%	55%	55%	50%
France	Number of Brackets	12	12	6	4
	Maximum Rate	60%	56.80%	52.75%	40%
Germany	Number of Brackets	2	2	2	2
	Maximum Rate	56%	53%	48.50%	45%
Italy	Number of Brackets	32	7	5	5
	Maximum Rate	72%	50%	45%	43%
Spain	Number of Brackets	30	16	6	4
	Maximum Rate	65.09%	56%	39.60%	27.13%
Ireland	Number of Brackets	5	3	2	2
	Maximum Rate	60%	52%	42%	41%
United Kingdom	Number of Brackets	6	2	3	2
	Maximum Rate	60%	40%	40%	40%

\* Central government rates.

Source: OECD Tax Database ([www.oecd.org/ctp/taxdatabase](http://www.oecd.org/ctp/taxdatabase)) and calculations of the authors.

on the effectiveness of automatic stabilisers. The latter are also currently hurt by the implementation of the OECD Employment Strategy: Belgium, Denmark, Germany, and the Netherlands all experienced declining replacement rates and/or shortened benefit duration.

The decreasing size of the government may thus impair economic stability, as Fatás and Mihov (2001) argued (*cf. supra*), but it may also fuel social discontent or unrest. A quick look at Table 5 shows that except in a few countries (France, Ireland and the UK, even if the latest two experienced reductions in the replacement rates and benefit duration), the employment protection legislation (EPL) index<sup>11</sup> has been reduced since the mid-1980s and, quite often, sharply so like in Belgium, Germany, Italy, Portugal, Spain and Sweden. Lower taxes and lower protection may impair the effectiveness of automatic stabilisers and may contradict their advocates during the current crisis.

### 3.2.3 Unemployment expenditures

Some items of public spending, in particular those linked to the support of the unemployed, help to balance the consequences of shocks. A negative shock on aggregate demand is partly dampened by generous unemployment benefits which sustain consumption of those most dramatically hit by the shock. More active unemployment public expenditures – those labelled

<sup>11</sup> The EPL, introduced by Nicoletti *et al.* (2000), is extensively discussed in OECD (2004). It is built by aggregation of 18 indexes from three main areas: Employment protection of regular workers against individual dismissal; specific requirements for collective dismissals; and regulation of temporary forms of employment. As all aggregative indexes, it is not exempt from criticisms (see, e.g., Bertola *et al.*, 2000 and Fitoussi, 2003). Nevertheless, it is a useful representation of the trends in employment protection over time.

Table 4

**Main Corporation Tax Rate**  
(percent)

Country	1990	2000	2005	2009
Austria	30		25	20
Belgium	43	40.2	35.5	35.5
Denmark	50		28	25
Finland	33	29	26	26
France	42 (distributed profit) 37 (retained profit)	37.8	34.9	34.4
Germany	36 (distributed profit) 50 (retained profit)	52	39.3	15.8
Greece	46 (40: industry)		32	25
Ireland	43 (10: industry)	24	12.5	12.5
Italy	36	37	33	27.5
Luxembourg	34	37.5	30.4	21.8
Netherlands	35		31.5	25.5
Portugal	34		27.5	25
Spain	35	35	35	30
Sweden	52		28	26.3
United Kingdom	35	30	30	28

Sources: *European Tax Handbook* 2005 and 2009, year 1990 reproduced from Sterdyniak (2005, p. 24), and year 2000 reproduced from Saint-Etienne and Le Cacheux (2005, p. 22).

under the heading of active labour market policies (ALMP), mostly training – also reduce the costs of unemployment for the unemployed, promoting their employability and improving their probability of finding a new job, thus shortening unemployment duration. Expenditure aimed at fighting unemployment can help to maintain economic stability through a combination of supportive measures for the demand for labour and enhancing the effective supply of labour.

Consequently, the sum of passive *and* active unemployment public expenditures reveals the stabilisation properties of unemployment expenditures: passive expenditures like benefits undoubtedly impinge very quickly on the aggregate demand whereas active expenditures are meant to reduce the duration of unemployment for those unemployed.

In general, the responsiveness of unemployment expenditures to the unemployment rate has decreased, thus reducing the stabilising properties of the system. Figure 3 displays pairs of yearly variations<sup>12</sup> in unemployment public expenditures (active and passive expenditures) and yearly variations in unemployment rates, for the EU-15 countries, distinguishing two sub periods: 1991-97 and 1998-2005.<sup>13</sup>

<sup>12</sup> With a short sample it has not been possible to perform a panel test with fixed effects, so that we have chosen a specification in first differences to remove country effects.

<sup>13</sup> The Amsterdam Treaty in 1997 made clear that the transition period towards the adoption of the Euro would not be followed by a benign-neglect attitude towards public deficits: the convergence criterion of a public deficit below 3 percentage points of GDP was soon to become a rule of conduct within the newly constituted Euro area.

On this figure, we expect pairs to be evenly distributed on an upward line whose slope would reveal the average elasticity of unemployment expenditures to the unemployment rate. There is actually a very interesting pattern in Europe: since 1998, the elasticity of unemployment public expenditures to the unemployment rate has been significantly lower than before (0.1 rather than 0.2 on average). Stated differently, the relationship between variations in unemployment expenditures and unemployment rates was stronger in the preceding period despite the Maastricht public finance criteria.

It is also noteworthy that the level of unemployment expenditures for the same rate of unemployment has decreased since 1998, in comparison with the preceding period. This latter property of the European social system appears clearly in the cases of Italy, France, Spain, Austria and, to a lesser extent, Germany (Figure 4). The UK is an outlier in this respect: With the exception of one point in the 1998-2005 sample, the relationship between unemployment expenditures and unemployment rate has hardly changed.

The stylised facts on the reduction of tax rates, the reduction in the progressivity of the tax and benefit systems, and the reduction in the Employment Protection Legislation, all seem to point unequivocally towards a decrease of the effectiveness of automatic stabilisation in European countries.

Therefore, public deficits may be less and less cyclical, or less and less able to dampen fluctuations. In the literature, (e.g., Girouard and André, 2005) it is customary to report elasticities of taxes, transfer payments and other expenditures with respect to GDP growth, elasticities which have generally remained constant over time. Looking at unemployment expenditures only, it is however possible to suggest that for most of EU countries their relationship with GDP growth rate has changed substantially since the end of the 1990s.

#### 4 How to substitute for automatic stabilisation?

If the effectiveness of automatic stabilisers has decreased, as we documented in the previous

**Table 5**

#### **EPL Index, \* Selected Years**

<b>Country</b>	<b>1985</b>	<b>1995</b>	<b>2005</b>	<b>2008</b>
Austria	2.21	2.21	1.93	1.93
Belgium	3.15	3.15	2.18	2.18
Denmark	2.4	1.5	1.5	1.5
Finland	2.33	2.16	2.02	1.96
France	2.79	2.98	3.05	3.05
Germany	3.17	3.09	2.12	2.12
Greece	3.56	3.5	2.73	2.73
Ireland	0.93	0.93	1.11	1.11
Italy	3.57	3.57	1.82	1.89
Netherlands	2.73	2.73	2.12	1.95
Portugal	4.19	3.85	3.46	3.15
Spain	3.82	3.01	2.98	2.98
Sweden	3.49	2.47	2.24	1.87
United Kingdom	0.6	0.6	0.75	0.75
US	0.21	0.21	0.21	0.21
EMU11**	-	2.75	2.23	2.2

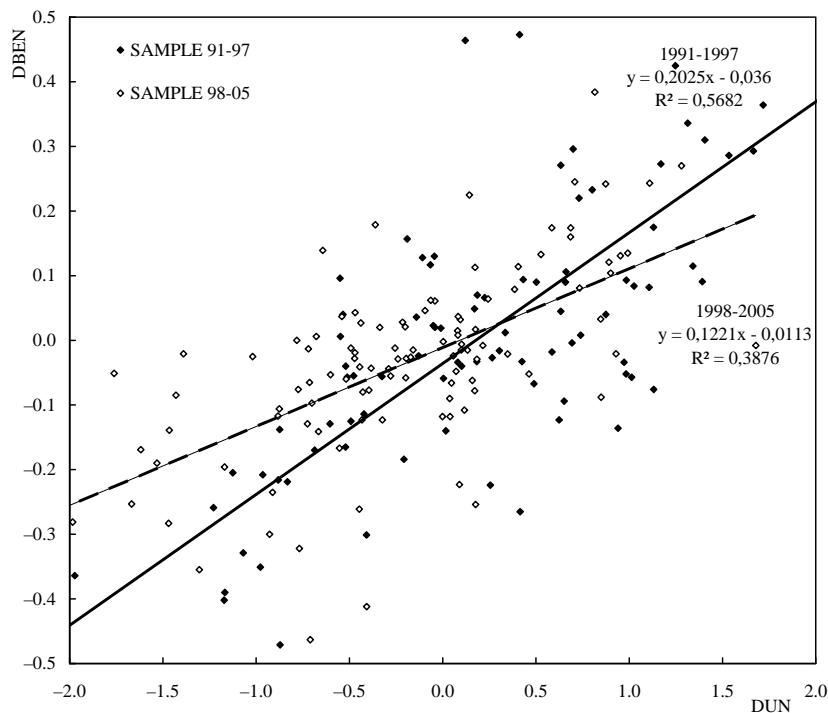
Source: OECD, Employment Outlook, 2004. Data for 2005 and 2008 from OECD STATS (<http://stats.oecd.org/index.aspx>).

\* Version 1 (unweighted).

\*\* EMU11: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Slovak Republic, Spain.

Figure 3

**Relationships Between the Variation in Unemployment Public Expenditures (Expressed in Percentage Points of GDP) and the Variation in Unemployment Rate, Both Stated in Percent, EU 15, 1991-1997 and 1998-2005**



Source: OECD and computations by the authors.

section, we need to ask whether something else emerged, that could allow the system to adjust. In fact, it may be argued, that in a competitive world, where markets (for labour, goods and services or finance) are highly flexible, prices adjust rapidly to bring output fluctuations under control. The operation of automatic stabilisers could thus turn out to be less necessary than in the past.

Although the above-mentioned argument is common among economists who promote more flexibility and “structural reforms” in Europe (see, e.g., Sapir *et al.*, 2003), it needs to be supported by identifiable empirical facts. In the vein of McConnell and Perez-Quiros (2000), who documented the decline of US output

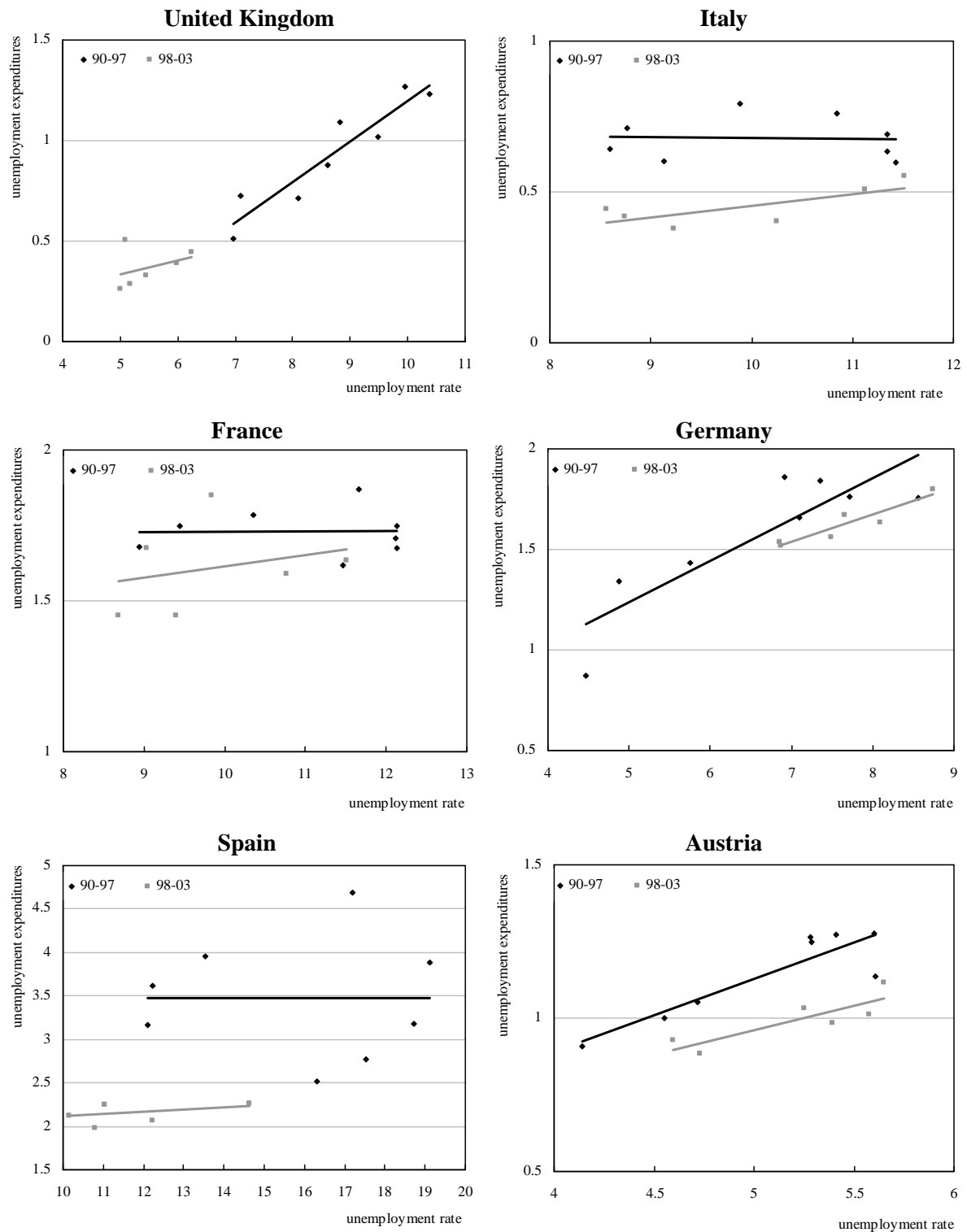
volatility, we study output volatility in Euro area countries taken as a whole, and in some EU-15 countries taken individually. We remove the mean of GDP growth from yearly GDP growth rates; we then fit a constant and a linear trend to the ensuring gap; and we perform a CUSUM and CUSUM of squares test on the cumulative sum of the recursive residuals.<sup>14</sup> The CUSUM of squares test reports possible instability in the variance of the parameters.

For the Euro area taken as a whole, parameter instability occurs only around the German reunification years (Figure 5). Nevertheless, although not statistically significant, parameter instability increased between 1985 and 1991. The CUSUM of squares test for the Euro area detects statistically significant instability in the variance during the crisis of 1993. Movements outside the critical lines, which are suggestive of variance instability, are also revealed in the UK from 1975 to 2000, in Italy from 1978 to 1986, in the Netherlands from 1980 to 1997, and in Sweden from 1981 to 1998 (figures available upon request). Over the recent years, like the US, Europe seems to have experienced a decline in output volatility.

<sup>14</sup> A well-known drawback with a CUSUM test based upon recursive residuals is that a shift late in a sample is likely to go relatively unnoticed. A CUSUM test using OLS residuals gives better results for late-sample data, but none of the tests can be considered significantly superior to the other (Ploberger and Krämer, 1992).

Figure 4

**Relationships Between Unemployment Public Expenditures (Expressed in Percentage Points of GDP) and Unemployment Rate, 4 Main EU-15 Countries, 1991-97 and 1998-2003**



Source: OECD and computations by the authors.

Figure 5

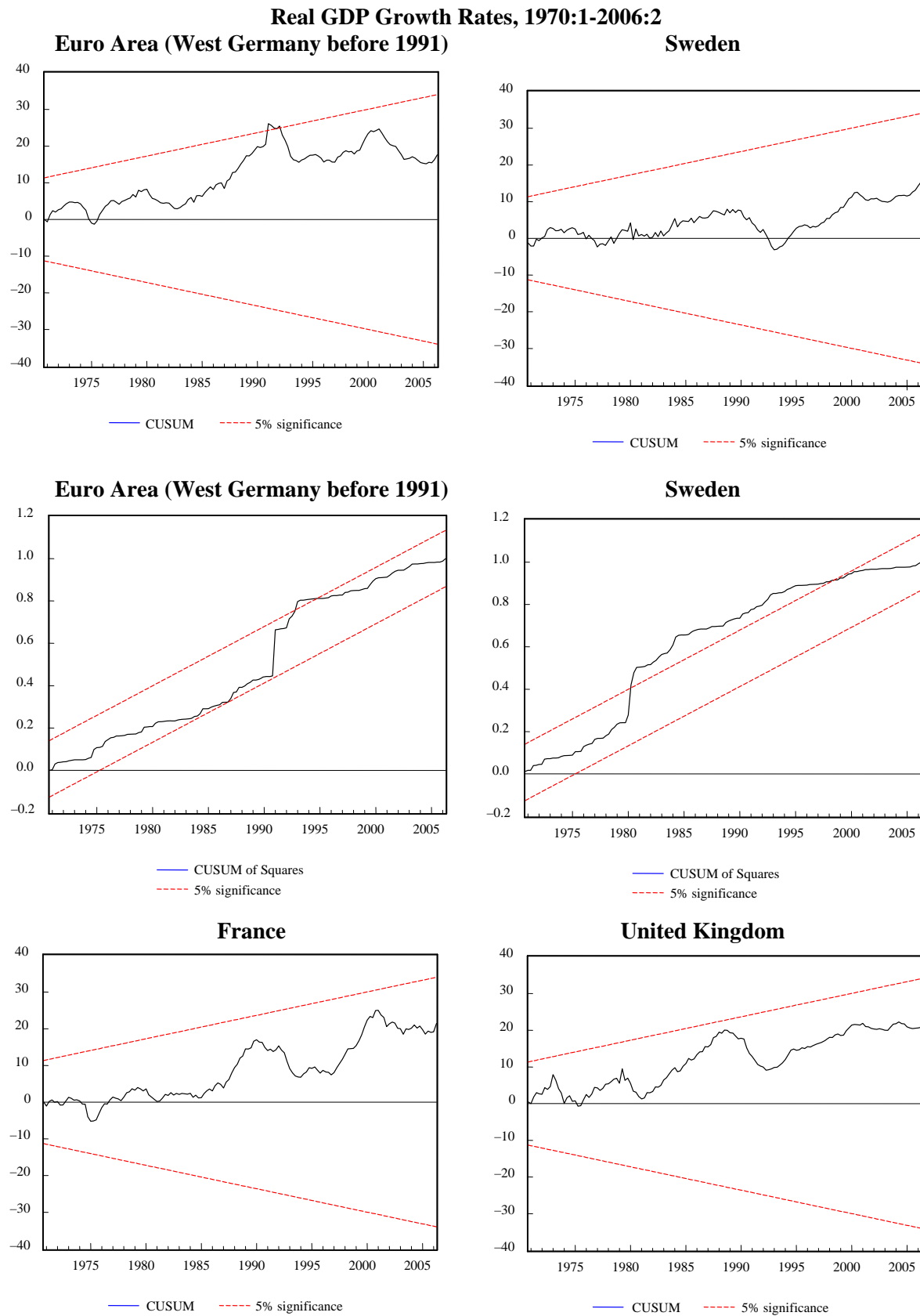


Figure 5 (continued)

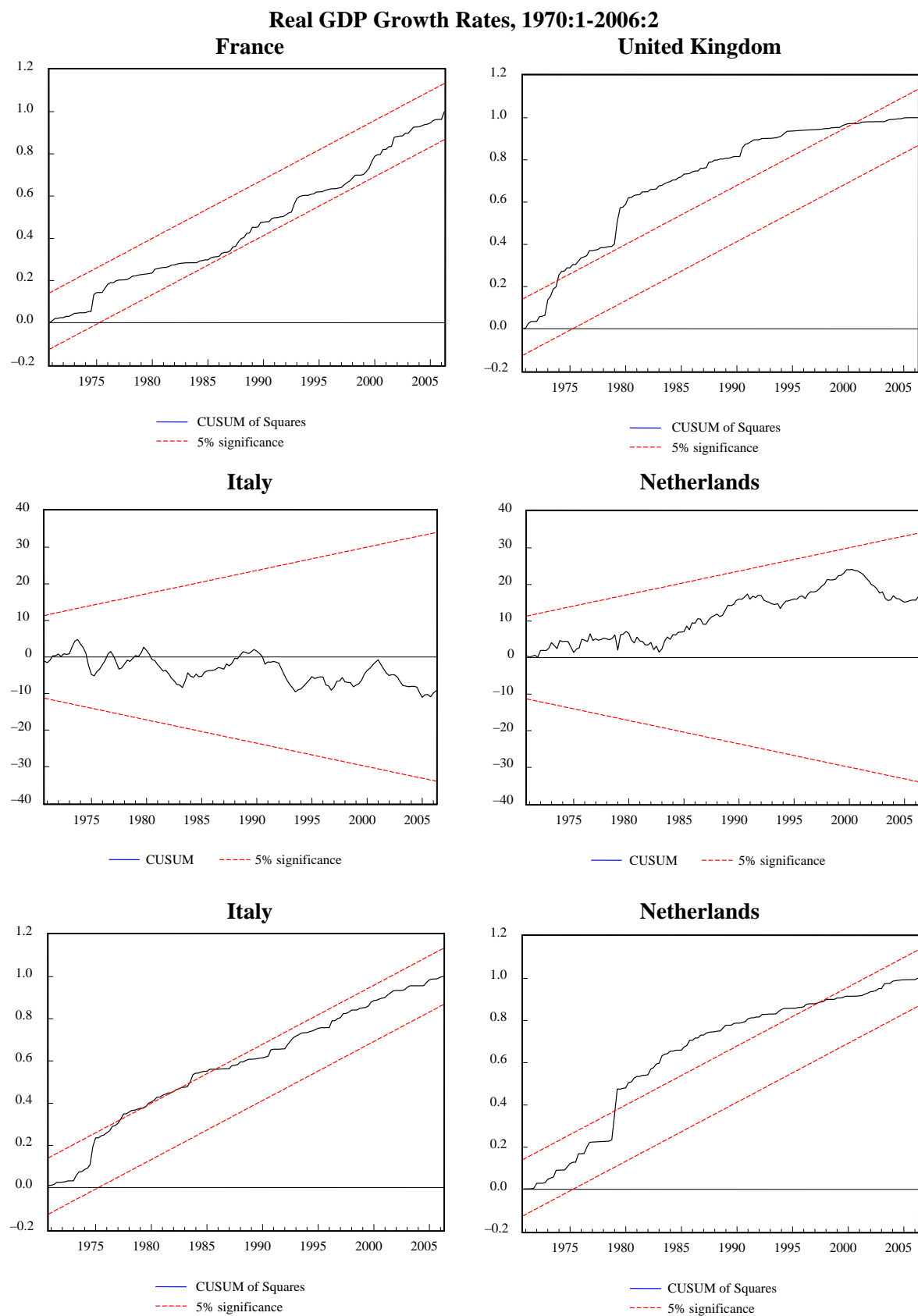
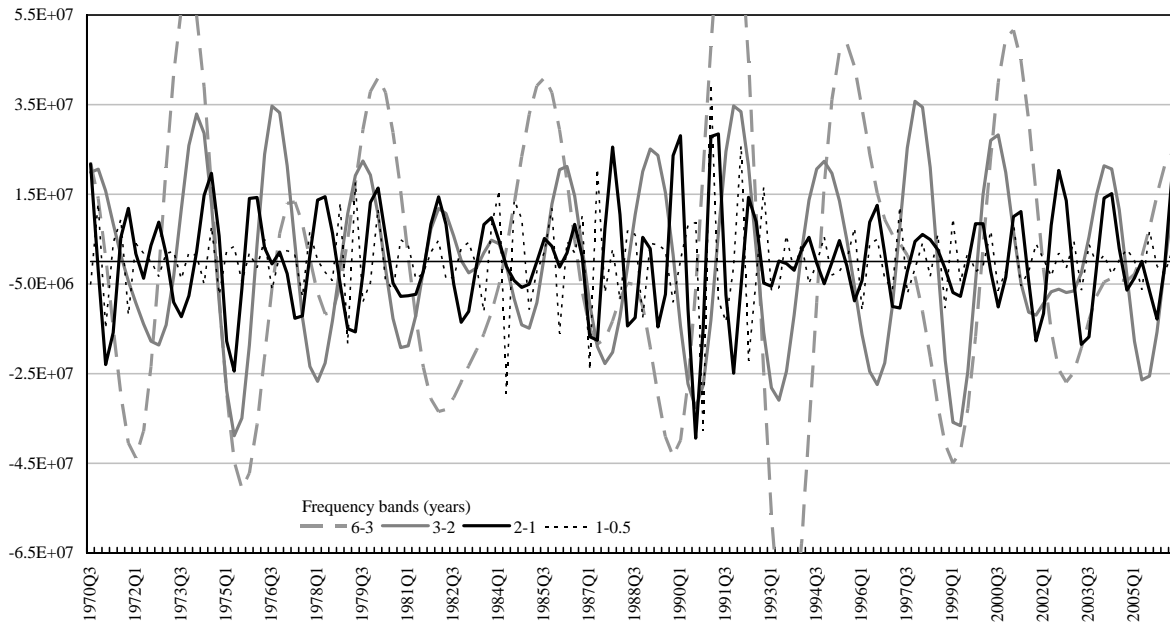




Figure 6

**Cyclical Components for the Euro Area Real GDP**  
(selected frequencies)



Source: OECD. Series obtained using the Iacobucci and Noullez (2005) filter.

Nevertheless, contrary to what happened in the United States, the decreased variability in Europe happened against a background of soft growth through the 1990s, with the largest European countries, notably Germany and Italy, which experienced growth rates close to zero (in 2002-3) and significantly below the EU average. In a context of low growth, it is not surprising that the variability of growth decreased. To eliminate the effect of changing growth trends, we detrended the series and analyzed the behaviour of cyclical components. We used the filter proposed by Iacobucci and Noullez (2005) that over short samples has a better performance with respect to more widely used filters (like Baxter-King or Hodrick-Prescott). Figure 6 shows the cyclical components of real GDP for the euro area for a number of frequency bands, from medium (6-3 years) to very short (1 year-6 months) cycles. A visual inspection shows that, in particular for the 6-3 year band, we observe an increase in variability in the early 1970s, and in the early 1990s, two periods of macroeconomic turbulence. Nevertheless, the picture shows no clear reduction in variability in recent periods, no matter what frequency we examine. To obtain a less impressionist assessment, we computed, for each of the frequency bands, the standard errors of two subperiods of equal length (1970Q3 to 1988Q2, and 1988Q3 to 2006Q2). The results, reported in Figure 7, show that for all the frequencies (except the very long cycles 18-6 years) the variability in the second period is slightly larger than in the first. Using a cut-off between the periods linked to institutional changes (for example the Single European Act of 1986, or the Maastricht Treaty of 1992), does not alter significantly our findings, which are also robust to detrending the series with the HP filter. Furthermore, this cyclical pattern is confirmed for most individual countries, with the exception of the UK.<sup>15</sup>

<sup>15</sup> Figures are not reported. They are available from the authors upon request.

Finally, we may notice that, contrary to the US, the EMU countries are confronted with a very specific policy architecture which leaves monetary and fiscal policy uncoordinated and whose federal budget is both small (1 percentage point of EU-25 GNP) and not allowed to contribute to stabilising the economies. This fetters domestic fiscal policies.

Thus, we can conclude that the likely occurrence of asymmetric shocks in the EU and the institutional framework question the belief that increasing flexibility will be sufficient to assure income stabilisation (especially when average growth will go back to more standard levels). This is somewhat confirmed if we analyze Figure 5 together with Table 5, that documents a significant increase in labour market flexibility. This flexibility did not yield a significantly improved capacity of the economy to react to shocks. In the next section we argue that in light of a number of recent articles on the subject, and of the decreased effectiveness of automatic stabilisation described above, discretionary fiscal policy should be reconsidered as a possible tool for economic stabilisation, either to dampen output fluctuations or to sustain potential output through public investment expenditures.

## 5 Concluding remarks

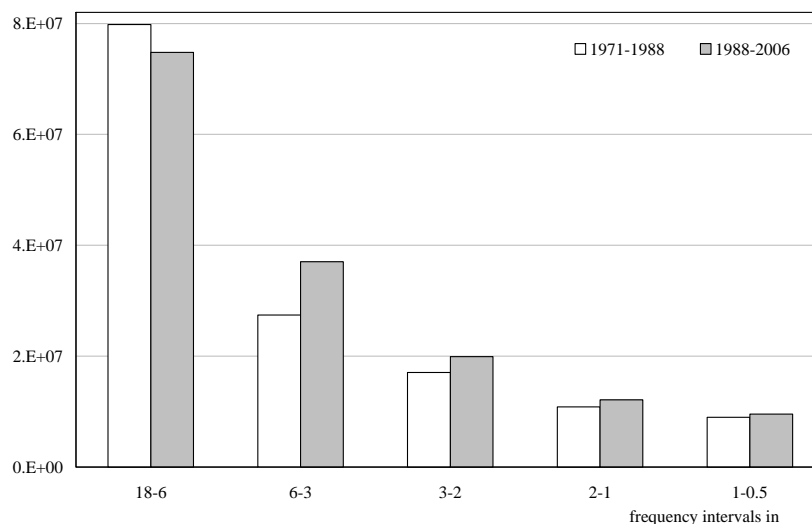
In this paper we highlighted a contradiction between the spirit of the Stability and Growth Pact, and the actual behaviour of fiscal policies in Europe. On the one hand the Pact is designed with the objective to rule out any discretion in the conduct of fiscal policy, thus leaving to automatic stabilisation the task of countercyclical policy; on the other hand, though, a number of stylized facts that we reported points to a significant decrease of the role of automatic stabilisation. Progressivity of the tax system and the size of the public sector have been reduced in most European countries, and the sensitivity of unemployment benefits to the unemployment rate has decreased since the late 1990s.

Thus, even if we were to adhere to the principles behind the setting chosen by European countries to rule economic policy, and we gave importance only on automatic stabilisation, we would be forced to admit that nowadays fiscal policy in the EMU is mostly dysfunctional.

We believe that this moment of crisis may actually be an opportunity. The debate opened at the beginning of this decade on the flaws of the Stability Pact has been closed by the reform of

**Figure 7**

**Standard Error of the Filtered Series at Different Frequencies**  
(two subsamples of equal length)



Source: OECD; series obtained using the Iacobucci and Noullez (2005) filter, and calculations of the authors.

2005 that took it out of the political agenda. Maybe that reform was too hasty, and what is needed is a more radical rethinking of the framework for fiscal policy. The institutional framework that rules the economic governance of Europe, restricting fiscal policy to the working of automatic stabilisers, was not fortuitous, as it stemmed quite logically from the widespread aversion of the academic profession for discretionary fiscal policy, which emerged over the 1980s and 1990s. Four main sets of arguments have been advanced to justify this aversion: the first is that discretionary fiscal policy is subject to a number of delays (from decision to implementation) that make it impossible to use in reaction to shocks. By the time the effects of policy are felt, the shock it was supposed to address may have vanished.

The second set of arguments against discretionary fiscal policy deals with crowding out effects on private expenditure (in particular investment) up to the point at which the overall increase in income becomes negligible. This may happen because the deficit is financed with borrowing, thus increasing interest rates (directly and because of the inflationary pressure of deficit) and the cost of investment; or because public spending is aimed at moving the economy away from some sort of optimal or “natural” position, so that rational consumers react in order to bring the system back to its natural level. A weaker version of this argument focuses on the intertemporal budget constraint of rational consumers (whose role we highlighted in the model of Section 2 above) who anticipate future tax increases to repay for current deficits, and hence react by increasing their current savings and reducing their expenditure (the Ricardian equivalence, see Barro, 1974).

A third argument against fiscal policy discretion, made popular by the recent experience in the US, is the *twin deficits* hypothesis; based on the national accounting identity it is possible to show that an increase in budget deficit may create an equivalent deficit of the current account, so that total domestic income may not increase, and the expansionary effect may benefit other countries through increased imports.

Theoretical counter arguments or empirical weaknesses may be found for each of these reasons against the use of discretionary fiscal policy as a tool for stabilisation (see, e.g., Arestis and Sawyer, 2003; and Blinder, 2006). Beyond the “critique to the critique”, there is at least one prominent reason for defending discretionary fiscal policy: a recent strand of literature, started by Blanchard and Perotti (2002), confirms that the empirical evidence is unable to rule out a positive role for discretionary fiscal policy. If anything, it generally shows significant short term effects and also, in some studies, a significant effect in the long-run (the multiplier values for some of these papers are reported in Table 6).

The papers in the vein of Blanchard and Perotti (2002) borrow from the structural VAR methodology. Very simple reduced form VAR models are estimated, and then the identification is obtained by imposing to the contemporaneous residual correlation matrix a number of constraints that originate in the institutional system, in estimated elasticities, and so on. Contrary to Taylor’s (2000) methodology, Blanchard and Perotti (2002) attempt to extract purely discretionary fiscal components. They do not use computed structural deficits which rely on estimations of the output gap and the biases they are associated with. Moreover, the discretionary stance is corrected for interest payments.

The impulse response functions for these exercises usually show short term Keynesian effects across countries (Blanchard and Perotti, 2002; Perotti, 2004; Biau and Girard, 2005; Giordano *et al.*, 2007; Benetrix and Lane, 2009). Perotti (2004) is an exception in this respect: he found low and even negative fiscal spending multipliers in the short run in the UK, Australia, and Canada, depending on the sample (1960-2000, 1960-79, 1980-2000). Benetrix and Lane (2009) found out a positive multiplier effect in the short run in Ireland, and pointed to the superiority of public investment on government consumption to produce Keynesian-like effects of fiscal policy.

Table 6

**Fiscal Multipliers in the Recent VAR Literature**

Authors	Country	Multiplier of ...	
Blanchard and Perotti (2002)	USA	expenditure	= [0.9; 1.3] (short run)
Perotti (2004)	USA	expenditure	= [0.1;0.7] (short run) = [-1.3;1.0] (long run)
	Germany	expenditure	= [0.8;1.3] (short run) = [-0.7;1.1] (long run)
	UK	expenditure	= [-0.2;0.5] (short run) = [-1.1;0.8] (long run)
	Canada	expenditure	= [0.1;0.6] (short run) = [-2.2;0.9] (long run)
	Australia	expenditure	= [0.0;0.6] (short run) = [0.2;0.6] (long run)
Biau and Girard (2005)	France	expenditure	= 1.4 (short run) = 1.8 (long run)
Giordano <i>et al.</i> (2007)	Italy	expenditure	= 1.7 (short run)
Creel <i>et al.</i> (2007)	France	primary balance	= 0.8 (short run) = 2.0 (long run)
Creel <i>et al.</i> (2009)	UK	investment	= 3.1 (long run)

Creel *et al.* (2007, 2009) recently extended the methodology of Blanchard and Perotti (2002) by imposing longer run constraints (namely through the introduction of a debt accumulation equation); neglecting these constraints, as done in the existing literature did not seem justified, especially when trying to assess the effect of public investment. They show that, if the long term interaction between debt, fiscal policy and monetary policy is not artificially shut off, the long run multiplier remains significantly positive and equal to 2 in France after a discretionary shock on the primary deficit and to 3 in the UK after a discretionary shock on public investment.

It is therefore possible to conclude that, on empirical grounds, a discretionary fiscal policy has a positive and persistent impact on output. From a short run perspective, it also means that this policy has an impact on long-run economic growth, and hence on potential output. This empirical conclusion is consistent with a strand of the literature which argues that the natural rate of growth is sensitive to aggregate demand (see, e.g., Leon-Ledesma and Thirlwall, 2002) or with papers which argue that fiscal contractions impinge negatively on potential output (see, e.g., Fazzari, 1994-95, p. 245). This paper, also drawing on the small illustrative model that we presented, suggests that a reformed fiscal rule for Europe should leave some room for discretionary policy, at least in compensation for the ineffectiveness of automatic stabilisers.

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## EU FISCAL CONSOLIDATION AFTER THE FINANCIAL CRISIS LESSONS FROM PAST EXPERIENCES

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*The global financial crisis has led to a sharp deterioration of EU countries' public finances. Views are split regarding the most appropriate consolidation strategy to follow, in particular considering: the timing of fiscal consolidation in relation to the path of economic recovery reflecting (a) the trade-off between consolidation and stabilisation; (b) fiscal consolidation in the context of a distressed banking system where the credit channel is hampered and without which economic recovery can hardly take place, (c) the absence of exchange rate adjustment in the euro area which could make it more difficult for countries with competitiveness problems to achieve successful fiscal consolidation. The existing literature on fiscal consolidations provides only partial evidence on these issues. In this paper we set out to investigate these questions by drawing on EU (and non-EU OECD) experiences during the period 1970-2008. We estimate econometrically the determinants of successful fiscal consolidations and show that: (i) in the presence of a systemic financial crisis, the repair of the banking sector is a pre-condition for a fiscal consolidation to succeed in reducing debt levels, especially so when fiscal consolidations are sharp, (ii) even after the banking sector is repaired, fiscal consolidations are usually less successful than in absence of financial crises, although more vigorous fiscal consolidations (i.e., cold shower) tend to yield higher results, (iii) current debt dynamics in the EU are very unfavourable and in some cases, coupled with rising debt servicing costs and much deteriorated growth outlook warranting differentiated consolidation strategies across EU countries, (iv) we do not find conclusive evidence in support of exchange rates (including real exchange rate) depreciation/devaluation as enhancing the success of fiscal consolidation as their effect appear to be low and insignificant.*

### 1 Introduction

Following the financial crisis, rising government deficits, low economic growth and support to the financial sector are leaving a legacy of rapidly growing government debt ratios. A phasing out of the stimulus measures and cyclical recovery, including a rebound in tax revenue from the crisis-related lows, will be insufficient to prevent government debt ratios rising to even higher levels before the end of the next decade. By historical standards, the projected sharp increase in government debt ratios is nothing out of the ordinary in a financial crisis, however, although the rise in debt in most EU countries comes on top of comparatively high starting levels, reflecting the increase recorded in the 1980s which was only partially stemmed subsequently. Significant consolidation will be needed to reduce public debt and limit its negative impact on output and growth.

Views are split regarding the most appropriate route to follow in the current context given that the need to reduce debt levels comes in a difficult time where growth is still fragile, the credit channel is still impaired and tensions are heightened in financial markets. Many questions remain unanswered, in particular regarding the appropriate timing of the fiscal consolidation in relation to

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The views expressed in this paper are not necessarily those of the European Commission.

the economic recovery, the role played by the financial turmoil and potential shoot-up in debt servicing cost and the macroeconomic adjustment mechanisms countries avail of, in particular the exchange rate, to weather the difficult times to come.

Although the current situation is exceptional in many respects, in particular regarding the simultaneity of the debt rise across developed economies, it shares many common features with past debt increases episodes which can be investigated in order to yield relevant policy messages. In this paper we therefore consider past evidence regarding the determinants of successful fiscal consolidations considering a panel of EU and non-EU OECD countries during the period 1970-2008. We use as criteria for defining a successful fiscal consolidation the reduction in the debt level after a fiscal consolidation episode has started while other authors, and in fact most existing studies, have focused on the post-consolidation behaviour of the budgetary balance (or the cyclically-adjusted budgetary balance). We opt for a debt-based criterion in order to highlight the most immediate objective of policy makers of EU policy makers which is to halt and eventually reverse the increase in public debt following the eruption of the global financial crisis in 2008. The success of fiscal consolidation in reducing the debt-to-GDP ratio depends not only on the improvement of the primary fiscal balances however, but also *inter alia* on the repair of the banking sector as well as on the dynamic of the growth/interest rate differential. A number of factors are of importance in determining the best strategy for debt reduction in such a context, in particular (i) the trade-off between consolidation and stabilisation and the timing and time profile of fiscal retrenchment in relation to the financial crisis (ii) the role played by high starting debt level position that prevail across EU countries; (iii) the composition of the adjustment (*i.e.*, expenditure cut or tax increase) (iv) the role of nominal and real exchange rate adjustment.

The existing literature on fiscal consolidations provides a number of indications regarding the determinants of successful fiscal consolidations, in particular regarding their composition (*i.e.*, consolidations based on expenditure cuts vs. tax revenue increase or both), nature (gradual or sharp consolidation), the role played by flanking policies (monetary easing, exchange rate devaluation, structural reforms and reforms of fiscal institutions) and the influence of macroeconomic conditions (starting business cycle position) which are of direct relevance to guide fiscal policy making in the present situation. This literature remains silent on two important aspects specific to the current situation, however, namely, the interplay between the banking crisis resolution and fiscal consolidations on the one hand and the role played by the starting debt level on the other hand. We argue that fiscal consolidation strategies in the current EU circumstances should pay special attention to these two elements for a number of reasons.

First the current debt increase in most EU countries can be thought (at least in part) as representing a transfer from the private – banking – sector to the public sector of the liabilities linked to the financial crisis. The substitution of private sector liabilities by public sector liabilities takes place in a context of deleveraging economies in time where access to credit is hampered following a period of sharp increase in private indebtedness in a number of EU countries. In presence of declining asset prices, subdued credit activity and weak private demand, fiscal consolidations cannot by themselves stabilise and, in the medium-run, even reduce public debt levels without being accompanied by credible policy actions to repair the financial sector. In the present context, therefore, the classical macroeconomic trade-off between consolidation (requiring sharp fiscal contraction) and stabilisation (requiring a soft fiscal retrenchment or even a continuation of the fiscal expansion) gets blurred as long as the credit channel remains impaired. We set out to examine these questions building on previous papers describing and analysing the consequences of systemic financial crises, in particular on Laeven and Valencia (2008) and Reinhart and Rogoff (2009).

Second, a specific feature of the prospective debt increase in the EU is that in today's crisis starting debt level were notably higher compared to past experiences. Countries starting off from

high debt level risk experiencing higher increase in interest rates under a no-policy change scenario and are thus more inclined to curb debt level decisively. Countries with already high debt levels before the global financial crisis will thus have greater incentives to undertake a fiscal consolidation which may also influence their likelihood of success. Put differently, the conditions determining the decision to consolidate might directly influence the chances of achieving successful fiscal consolidation which poses the well-known issue of sample selection bias of direct relevance when conducting econometric analyses. In this paper we investigate these issues econometrically by making use of two-stage probit estimation techniques, see in particular Heckman (1979). While standard in the microeconomic literature (especially in the field of labour economics) sample selection bias has, to the best of our knowledge, not been considered in the existing literature of the determinants of successful fiscal consolidations. In practice, such a selection bias might be especially relevant in the context of fiscal consolidations however, since the decision to initiate a fiscal consolidation episodes is contingent on the starting macroeconomic (including fiscal) conditions which in turns influence directly their chances of success.

In this paper we also address an additional question which has been given special attention recently in the EU, namely the role played by exchange rate adjustment in facilitating successful fiscal consolidations. While this issue has been treated by previous studies, it has often been argued in the current public debate that countries within the euro area would have additional difficulty to succeed in their fiscal adjustment effort as the nominal exchange rate cannot be devalued. While the existing literature has provided some evidence suggesting that exchange rate depreciations preceding fiscal retrenchment can play a favourable role to facilitate it, it has to the best of our knowledge not considered the case where the success of fiscal consolidation is assessed against a benchmark reduction in the debt level which, in the present circumstances, seems more relevant.

Our findings show that controlling for sample selection bias when analysing the determinants of fiscal consolidation is important to determine the role played by the starting debt level and interest rate increases (and associated snowball effects) in explaining the success of fiscal consolidations. In particular, we show that, contrary to existing studies making use of simple probit estimations, the use of a two-step estimation procedure *à la* Heckman suggests that the starting debt level (including its indirect effect via the snowball effect) tend to play a secondary role to explain the success of fiscal consolidations. This result suggests that, despite the high starting debt level of EU countries entering the current financial crisis, this feature in itself does not compromise the chances of success of fiscal consolidation plans currently devised by the EU Member States although a differentiation depending on country-specific situations seems warranted. Our results indeed suggest in particular that countries facing high starting debt level and high interest rate/low GDP growth potential have better chance of achieving successful fiscal consolidations if these were sharp and sustained while other countries where such constraints are less binding would be better off by undertaking more gradual fiscal retrenchment. However, in presence of a financial crisis a far more important factor appears to be represented by the need to repair the financial sector. While our results show that fiscal consolidations tend to be less successful in the aftermath of systemic financial crises (even controlling for sample selection bias), fiscal consolidation undertaken after such crises tend to be significantly more successful than fiscal consolidation undertaken while these are not yet over, especially so when fiscal consolidations are sharp (*i.e.*, cold showers). The repair the EU financial system thus appears to be a paramount condition for maximising the chances of success of current and future fiscal consolidation plans in the EU. Finally we do not find any conclusive evidence regarding the effect of exchange rate devaluation in facilitating successful fiscal consolidations, independently of the exchange rate considered (either nominal or real) or the currency regime (fixed vs. floating exchange rate). However, this result does not necessarily mean that a devaluation/depreciation might not facilitate fiscal consolidations per se, it does however suggest that devaluations/depreciation do not necessarily lead to significant reduction in the debt level.

The rest of the paper is organised as follows. Section 2 examines the empirical literature on the determinants of successful fiscal consolidations and considers more specifically the incidence of financial crises and high starting debt levels on the success of fiscal consolidations. The third section defines and discusses fiscal consolidations and the criteria used to gauge their success. The fourth section provides econometric evidence gauging the effect of specific factors and conditions on the probability of successful fiscal consolidations. Finally, we summarise the novel aspects of our analysis and draw some policy conclusions for successful debt reduction in the fifth section.

## **2 Empirical literature on the determinants of successful fiscal consolidations and questions specific to the current debt increase episode**

The existing literature on fiscal consolidations covers a range of possible determinants of success from economic (business cycle, state of public finance, etc.) to political factors (fiscal governance, electoral outcome, gradual vs. cold shower consolidations, etc.). The overview provided below focuses on the most relevant aspects of fiscal consolidations in the current EU context, namely the nature of fiscal consolidation (tax increases and/or expenditure cuts), the timing of fiscal consolidations in relation to the business cycle the importance of fiscal institutions, the role of exchange rates devaluations/depreciations. In the sequel we draw a number of questions specific to the current financial crisis.

### *2.1 Existing literature*

Fiscal consolidation based on expenditure cuts are found to be more effective, see, for instance, Alesina and Perotti (1995); Alesina *et al.* (1998); Alesina and Ardagna (1998); Von Hagen *et al.* (2002) and Maroto and Mulas-Granados (2007).<sup>1</sup> Tax-based consolidations can also be successful if the starting tax-to-GDP ratio is relatively low and implementation is gradual, see in particular Tsibouris *et al.* (2006). One important explanation of the superiority of expenditure cuts is that they are often accompanied by reforms aimed at improving public services' efficiency, see European Commission (2007). Tax-increases, on the other hand, often signal weak commitment to undertake structural reforms, see in particular Kumar *et al.* (2007). Measures directed toward long-run spending containment also send reassuring signals to financial markets on the long-run sustainability of public finances, see in particular Cottarelli and Viñals (2009). Improvements in fiscal institutions, medium-term budgeting and improved expenditure control help laying the foundations for sound long run public finances management, see European Commission (2007) and Kumar *et al.* (2007). A special case in point concerns the run-up to the EMU as many EU countries adopted explicit budgetary rules including balanced budget and expenditure rules, to qualify for euro area membership, see Debrun *et al.* (2008).

The evidence regarding the role played by the economic situation (both domestic and international) and monetary conditions is inconclusive: some argue that it is easier to build a consensus in support of fiscal consolidation during or shortly after a sharp downturn, see Drazen and Grilli (1993) and Kumar *et al.* (2007) while others suggest the opposite is true, see von Hagen and Strauch (2001). The role played by monetary policy is equally inconclusive with Hagen and Strauch (2001) and Lambertini and Tavares (2005) analyses suggesting that monetary policy actions have no influence on the success of fiscal consolidations. In a recent contribution Corsetti *et al.* (2010) further suggest that prospective spending cuts generally enhance the expansionary effect of current fiscal stimulus due to anticipation of lower inflationary pressure and long-term

<sup>1</sup> We do not discuss here results concerning the nature of public expenditure cuts, be it wages, consumption or investment cuts which also play a role. A more detailed review of these papers and econometric estimates can be found in European Commission (2007).

interest rates, although the timing of fiscal consolidation remains crucial if short-term interest rates are at their zero lower bound. Even in absence of the zero lower bound constraint, the fiscal contraction must not come too early and remain gradual in order to secure the economic recovery.

Finally, it has been argued that successful fiscal consolidations would be more difficult to achieve in the euro area given that countries cannot devalue their nominal exchange rate paving the way for an export-led recovery that would make successful fiscal consolidation easier to achieve. Two conditions must be fulfilled in order for this strategy to be successful, however: (i) it needs a strong and credible policy commitment to lower inflation in the long-run, though a pick-up in inflation in the short run may help reducing the debt ratio (ii) exchange rate pass-through must be contained in order to effectively improve competitiveness. While fiscal consolidation is needed to fulfil condition (i), fulfilling condition (ii) hinges on structural policies (that increase productivity) and the export-market structure (and foreign vs. domestic mark-ups) and are harder to monitor and control, see Goldberg and Knetter (1997) and Alesina and Perotti (1997). Only a handful of papers have so far provided evidence on fiscal consolidation and exchange rates suggesting that the effect of exchange rate (including both nominal and real) on the success of fiscal consolidations albeit significant is relatively small, see in particular Lambertini and Tavares (2005) and Hjelm (2002), while others have found that real exchange rate depreciation favours the start and continuation of fiscal consolidation episodes but fail to find evidence that real exchange rate depreciation favours debt reduction significantly, see Ahrend *et al.* (2006).

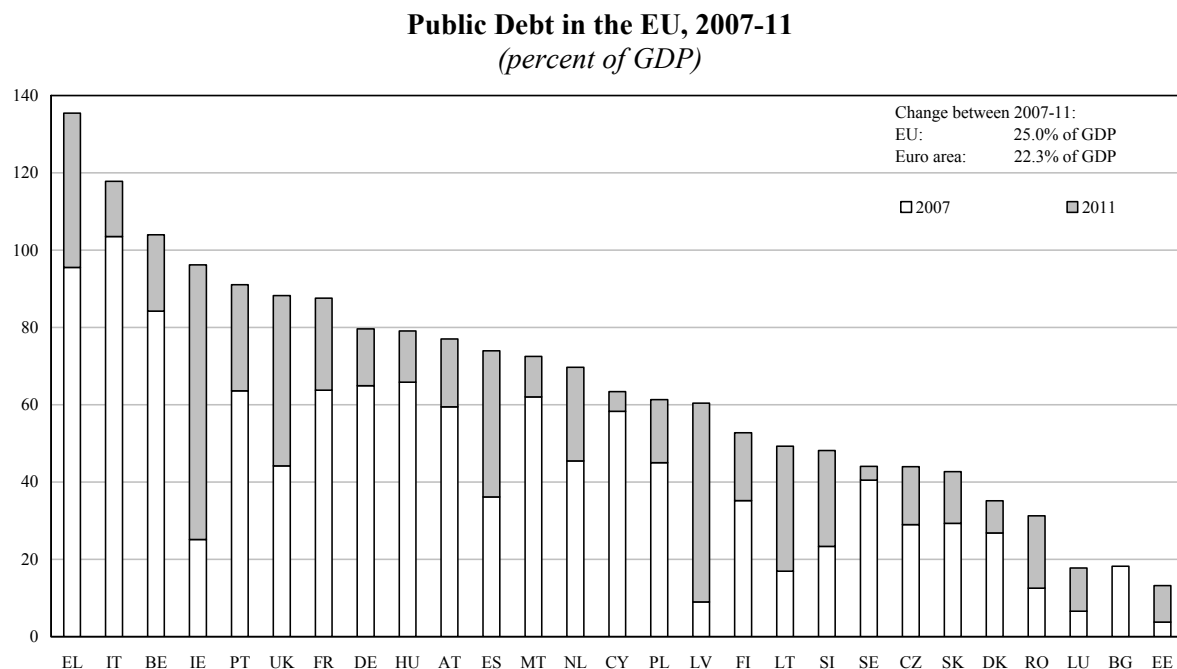
While these papers provide useful policy messages, they remain silent on a number of aspects which are especially relevant in the aftermath of the 2008-09 global financial crisis. We discuss two prominent aspects of the current crisis, namely, the interplay between the banking crisis resolution and fiscal consolidations on the one hand and the role played by high starting debt levels on the other hand.

## 2.2 Consolidation, public debt and financial crises

The current debt increase in most EU and non-EU OECD countries can be thought (at least in part) as representing a transfer from the private banking sector to the public sector of the liabilities linked to the financial crisis. Importantly, a high starting debt level renders the no-policy change debt dynamics very unfavourable in the EU, see in particular European Commission (2009a). Such context is expected to favour fiscal consolidation while the effect of the debt level on the success of consolidations depends on other conditioning factors, notably the resolution of the financial crisis. Generally speaking, financial crises are characterised by public sector liabilities replacing those of the private sector. Such substitution takes place directly as governments step in to inject liquidity and capital in the banking sector and guarantee its liabilities and indirectly as a consequence of a sharp contraction in private demand and private sector deleveraging in time where access to credit is particularly difficult (usually after a period of boom in credit). It follows that fiscal consolidations need to be accompanied by credible policy actions to repair the financial sector in order to achieve policy objectives including resuming growth and reducing debt levels.

The existing literature on systemic financial crises has underlined the distressful effects such crises may have on public finances, see in particular Laeven and Valencia (2008) and Reinhart and Rogoff (2009). In particular, an early consolidation with respect to the resolution of the financial crisis is likely to be ineffective if the economy settles at a (permanently) lower level of output. Factual evidence suggests that the potential fiscal costs of financial crises are directly linked to the time taken or needed to repair the financial sector. For instance the Japanese experience in the early 1990s suggests that too early fiscal retrenchment while the credit channel has not been fixed properly can prove highly counter-productive, see Bayoumi (2000). The case of Sweden in the early 1990s is often considered as a success as this country managed to quickly restructure its

Figure 1



Note: For Cyprus and Bulgaria, the public debt-to-GDP ratio is projected to fall by 1.3 percentage points until 2010.

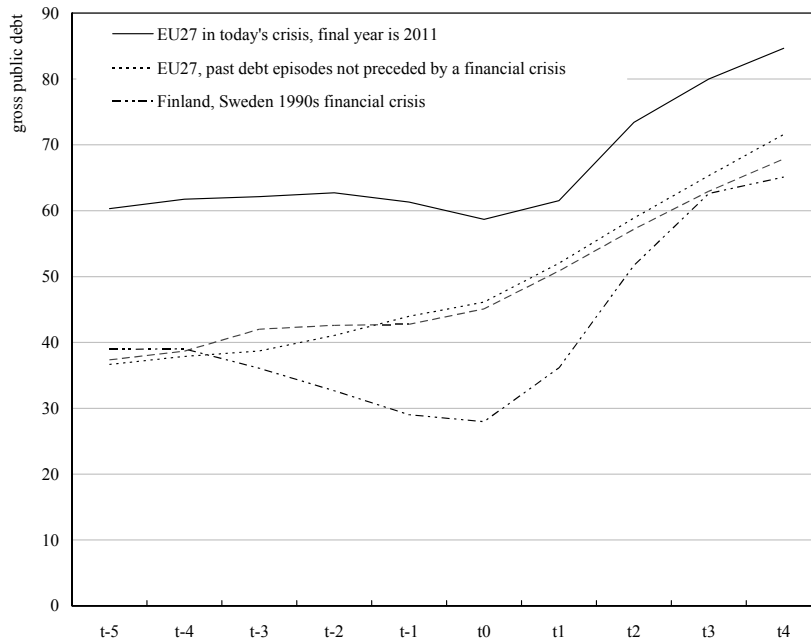
Source: Commission Services' *Autumn Forecasts 2009*, final storage.

banking sector allowing the initial fiscal stimulus to effectively sustain economic activity and to be followed by successful fiscal consolidations throughout the second half of the 1990s, see European Commission (2009b). The existing evidence regarding successful fiscal consolidations during or after systemic financial crises remains largely anecdotal however, while before the 2008-09 global financial turmoil, EU countries had been relatively immune to systemic financial crises, see European Commission (2009a) and Table 8 in the Annex.

Nearly all EU countries are expected to experience sharp rises in their debt level in the coming years with those countries primarily concerned being also those most directly affected by the 2008/2009 financial crisis as suggested earlier. According to the European Commission Spring 2010 forecast, the increase in the debt-to-GDP ratio between 2007 and 2011 should equal 25.2 per cent of GDP on average in the EU, a figure in line with past experiences of systemic financial crises, see Figure 1 and European Commission (2009a). A specific feature of the debt evolution compared to past experiences, however, is that in today's crisis EU countries started from higher debt levels. The magnitude of the debt increase foreseen during the 2007-11 period does not represent an unprecedented event, however, as many EU countries have experienced large debt rises in the wake of the two oil shocks in the 1970s and the 1980s. Figure 2 illustrates this by plotting the evolution of the average debt-to-GDP ratio of countries having experienced major debt increases since 1970 (a major debt increase being defined here as an increase of at least 20 per cent in the debt-to-GDP ratio over a period of five years, this definition being chosen as it is close to the average EU figure in the current crisis). Compared to other large debt increase episodes, the global financial crisis makes the current situation of the EU resembles much that of Finland and Sweden during the 1990s, with pre-crisis period being preceded by a period of stable or even slightly declining debt ratio, which can be explained by the favourable economic conditions that preceded

Figure 2

**Evolution of Debt-to-GDP Ratio  
During Major Debt Increase Episodes  
(percent of GDP)**



Source: Commission Services.

Note: Debt increase episodes are identified as corresponding to a minimum of 20 per cent increase in a maximum of five years. The year  $t_0$  corresponds to the first year marking the debt increase episode which in the current crisis corresponds to 2007. The last year in the current debt increase episode is 2011 (data taken from the Commission Autumn 2009 forecast) and the year  $t-5$  is 2002 and is set in order to cover a period of 10 years. For the other debt increase episodes the last year  $t+4$  is defined as the one where the debt increase over five year (on a moving average basis) reached its maximum value. The years  $t_0$  and  $t-5$  are then determined recursively to cover a time span of 10 years as for the current debt increase episode. The (unweighted) average value of the debt-to-GDP ratio for the following groups of countries (with time periods covered indicated in parentheses) are considered: *EU, past large debt increases*: Belgium (1974-83), Denmark (1974-84), France (1986-95), Greece (1978-87), Ireland (1975-84), Italy (1975-84 and 1985-94), Malta (1990-99), the Netherlands (1976-85), Portugal (1975-84), Spain (1976-85 and 1987-96), Sweden (1973-82). *Non-EU, OECD*: Japan (1970-79), Canada (1976-85 and 1984-93) and Iceland (1986-93). *Finland, Sweden 1990s financial crisis*: Finland (1985-94) Sweden (1985-94).

position also tending to rise.<sup>3</sup> As previously indicated, several countries have experienced large debt increases comparable in magnitude (and sometimes in speed) to the one foreseen in most countries for the period 2007-11. This is the case in particular of Denmark, Belgium and Ireland during the 1970s, Greece, Italy and Sweden during the 1980s and Finland and Sweden during the 1990s. By contrast, countries such as Germany, France and Portugal have tended to experience an almost continuous increase in debt-to-GDP ratio since the 1970s with some rare episodes of stable or slightly declining debt levels.

the financial crises in both cases. The ratio of public debt to GDP appears to rise very fast in the current financial crisis (2008 for today's EU27 and 1991 for Sweden and Finland).<sup>2</sup> By contrast, in previous non-financial crisis-related debt episodes a comparable increase in the debt ratio took place over a much longer period of time.

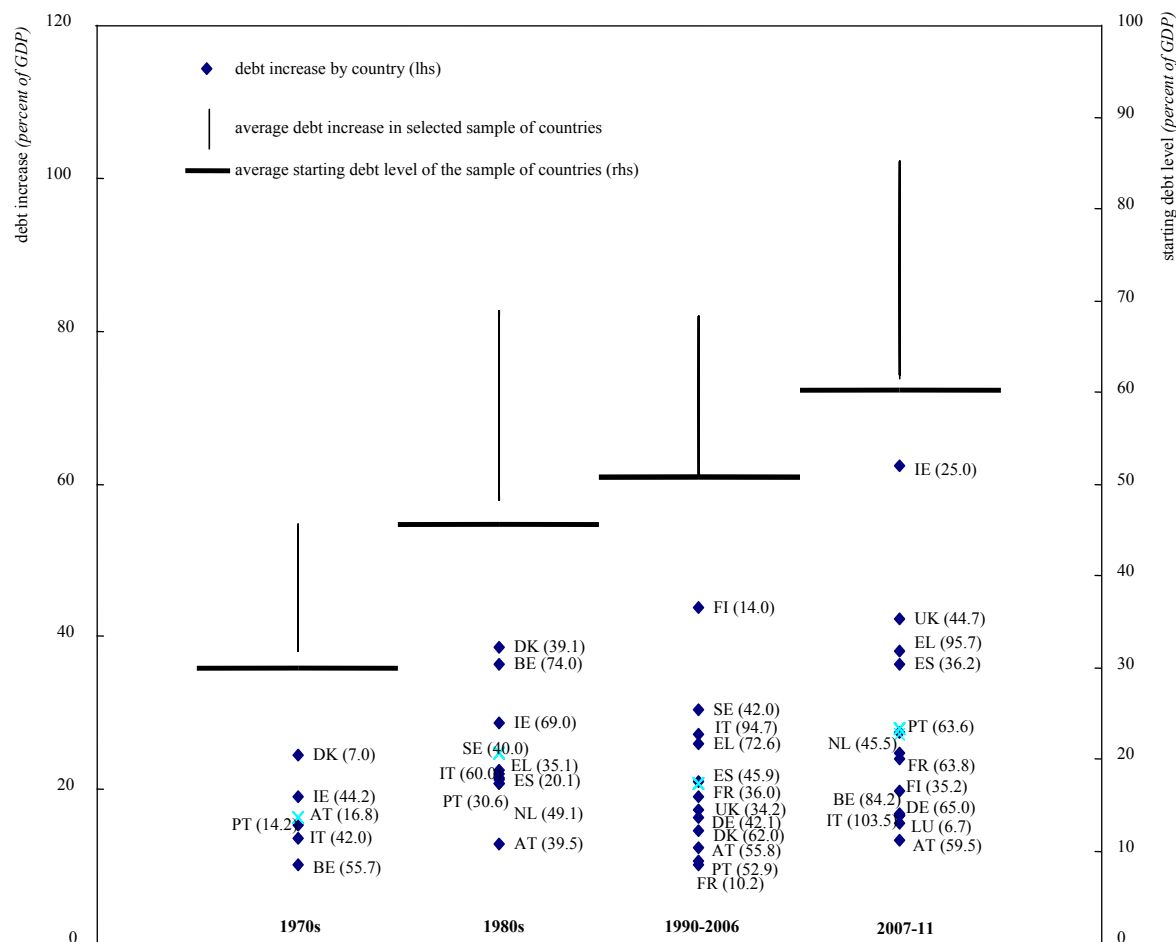
Since 1970 EU countries have experienced a growing number of large debt increase episodes, usually starting off each time from higher level of debt. Figure 3 broadens the set of large debt increase episodes considered by defining large debt increase episodes as an increase of at least 10 per cent (against 20 per cent in Figure 2) over a (maximum) period of three-years. Figure 3 shows that the number of countries experiencing such large debt increases has tended to grow over time with the average starting debt level

<sup>2</sup> This result also corresponds to the econometric evidence unfold in the European Commission (2009a) showing that the bulk of the debt increase in the aftermath of a systemic financial crisis usually takes place during the first two years of such crisis. This also corresponds to the descriptive evidence reported in Reinhart and Rogoff (2008).

<sup>3</sup> Ireland stands out as having entered the current crisis with very low debt-to-GDP ratio (*i.e.*, 25 per cent of GDP in 2007).

Figure 3

### Moving Up the Ladder: Debt Increases and Starting Debt Levels During Major Debt Increases Episodes in the EU15 Since 1970



Only debt increase over a (maximum of) three-year period and at least equal to 10 per cent of GDP are reported. Country-specific starting debt levels included in parentheses.

## 3 Defining fiscal consolidations and gauging their success

### 3.1 Defining a fiscal consolidation episode

To define a fiscal consolidation episode we use as criteria the value of the change in the cyclically-adjusted primary balance (hereafter CAPB). We follow the existing literature by defining a fiscal consolidation as an improvement in the CAPB of at least 1.5 per cent taking place in one single year (cold shower) or taking place over three years if each and every year the CAPB does not deteriorate by more than 0.5 per cent of GDP (gradual consolidation), see for instance Alesina and Perotti (1995) and European Commission (2007).<sup>4</sup> With such definition, one-year

<sup>4</sup> Alternatively, the OECD defines the start of a fiscal consolidation episode as an improvement in the CAPB by at least one percentage point of potential GDP in one year or in two consecutive years with at least a ½ percentage point improvement occurring (*continues*)



consolidations (*i.e.*, cold showers) are considered as full episodes while each year of multi-year consolidations episodes (*i.e.*, gradual consolidations) are considered as episodes on their own. Such definition was also used in Alesina and Ardagna (1998) and Alesina, Perotti and Tavares (1998). Alesina and Ardagna (2009) considered instead only one benchmark year for multi-year consolidation episodes. There is *a priori* no reason to consider that one definition is superior to the other as suggested by Alesina and Ardagna (2009) as results remain in general broadly similar in both cases.

### 3.2 Defining the success of fiscal consolidations

While the definition of a fiscal consolidation episode is quite homogenous across existing empirical studies, the success of fiscal consolidations can be gauged in different ways according to their impact on deficits and debt or on the growth performance, see Alesina and Ardagna (2009). Given that our intention to consider past experiences with fiscal consolidation to highlight features which are relevant to explain the current situation in the EU we use as measure of the success of fiscal consolidations the level of debt following a fiscal consolidation episode as in Alesina and Perotti (1995). Accordingly, a fiscal consolidation is considered as successful if it brings down the public debt level by at least five percentage points of GDP in the three years following a consolidation episode. Previous definition used in particular in European Commission (2007) considered instead that a fiscal consolidation episode was successful if the consolidation effort was safeguarded in the subsequent years (*i.e.*, whether the change in CAPB remained below a given threshold).<sup>5</sup> Both criteria (*i.e.*, considered the post-consolidation episode debt or the CAPB level) have their pros and cons. By using the CAPB criterion one avoids classifying as successful consolidations episodes where the debt reduction is due to favourable, albeit non-policy related circumstances. At the same time, it cannot exclude that consolidations that were insufficient to stem the increase in debt are labelled as success. The debt criterion was also preferred here in light of policy considerations. The global financial crisis has significantly affected EU countries' public finances with debt increasing very fast in most countries as evidenced above. The most immediate objective of policy makers in the current circumstances shall therefore be halting and reversing the increase in public debt. Tensions in financial markets that have emerged since the end of 2008 have highlighted the risk of feedback loop between high and increasing debt and the cost of debt servicing and its possible ramification to the rest of the economy. One could also argue that the use of discrete variables based on definitions of successful consolidation based on a given value debt reduction is too arbitrary. One could for instance consider alternative thresholds to qualify consolidations as successful or consider the possibility of measuring success making use of truncated variable (although the latter would require to the use of different econometric estimation method). Although we acknowledge these other possible alternative definitions and methods, in the present paper we chose to follow the existing literature on the topic and dealing with European countries in particular as mentioned above.

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in the first of the two years, see Guichard *et al.* (2007) and Ahrend *et al.* (2006). The fiscal consolidation continues as long as the CAPB improves. An interruption is allowed without terminating the episode as long as the deterioration of the CAPB does not exceed 0.3 percentage points of GDP and is more than offset in the following year (by an improvement of at least 0.5 percentage points of GDP). The consolidation episode stops if the CAPB stops increasing or if the CAPB improves by less than 0.2 percentage points of GDP in one year and then deteriorates. The consistency of the definition of fiscal consolidation episodes used here with the OECD one was checked. In most cases consolidation episodes are found to coincide. The correlation coefficient between the two series is equal to 0.71.

<sup>5</sup> More precisely, in the European Commission Public Finances Report 2007, a consolidation was labelled as successful if in the three years after the end of the consolidation episode the CAPB did not deteriorate by more than 0.75 per cent if GDP in cumulated terms compared to the level recorded in the last year of the consolidation period, *i.e.*, at least half of the overall minimum fiscal correction required to qualify as consolidation was safeguarded three years after.

### 3.3 Fiscal consolidations and financial crises

Figure 4 provides evidence regarding the incidence of financial crises on the success of fiscal consolidations. When looking at the specific case of financial crisis episodes, this evidence suggests that fiscal consolidations tend to be more successful when the financial crisis is resolved before the fiscal exit. This result holds in particular for EU countries while for non-EU OECD countries there is no clear indication that successful consolidations depend on whether these started during or after a financial crisis episode. Considering the EU, success rates

are about 56 per cent when consolidation is started after the financial crisis ended and only 9 per cent when consolidation started during a financial crisis against a benchmark case (*i.e.*, no financial crisis) of 34 per cent of successful consolidations. The econometric analysis presented in the next section includes also both EU and non-EU OECD economies in order to get sufficiently large data sample, especially in order to include cases of fiscal consolidations during or in the aftermath of systemic financial crises as discussed earlier. Based on data for the EU and a set of other non-EU OECD countries (namely Australia, Canada, Switzerland, Japan, Mexico, Norway, Turkey and the US) during the period 1970-2008, econometric analysis the next Section provides more evidence on the determinants of successful fiscal consolidation coinciding with (or immediately following) the occurrence of a systemic banking crisis.<sup>6</sup>

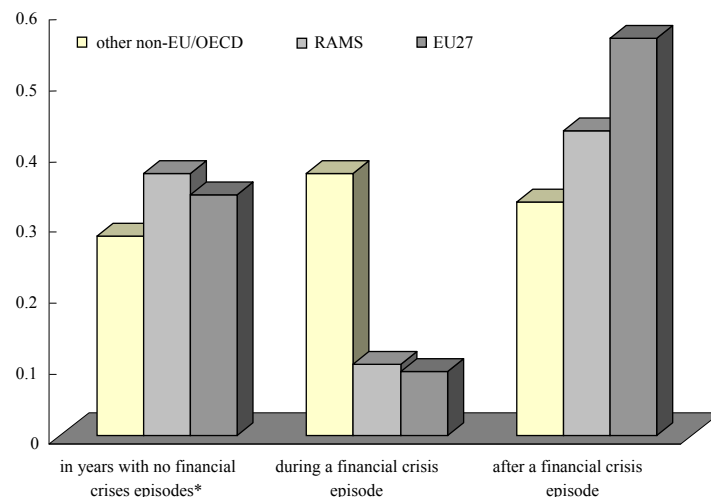
## 4. Fiscal consolidation with high debt and financial crises: descriptive evidence and econometric analysis

### 4.1 Descriptive results

Table 1 provides an assessment of the degree of success of past consolidation episodes in the EU15 by decade since 1970.<sup>7</sup> Fiscal consolidations succeeded in only 1/3 of cases, with most

**Figure 4**

**The Success Rate of Fiscal Consolidation and Financial Crises Episodes**  
(percent of consolidation episodes leading to reduction of debt level by at least 5 percentage points of GDP 3 years later)



\* Years with no financial crisis episodes exclude both financial crisis and post- (up to five years) financial crisis episodes. RAMS stands for Recently Acceded Member States.  
Source: Commission Services.

<sup>6</sup> South Korea or Iceland could not be retained due to insufficient data coverage. Table 8 in the Annex provides information regarding the systemic financial crisis episodes of countries included in our sample.

<sup>7</sup> The recently acceded Member States are not considered here in order to get consistent country groups over time.

**Table 1**

**The Success Rate of Fiscal Consolidations Under Alternative Success Criteria, 1970-2008<sup>(a)</sup>**

	1970s	1980s	1990s	2000s <sup>*</sup>	Overall
Success criterion based on debt reduction ( $t+3$ ) <sup>*</sup>	25.0 (16)	22.7 (44)	47.6 (42)	42.9 (14)	34.5 (116)
Success criterion based on debt reduction during or following major debt increase periods ( $t+3$ ) <sup>*</sup>	0.0 (5)	25.9 (27)	31.6 (19)	0.0 (3)	24.1 (54)
Success criterion based on debt reduction during or following major debt increase periods ( $t+5$ ) <sup>**</sup>	0.0 (5)	29.6 (27)	36.8 (19)	0.0 (2)	28.3 (53)
Success criterion based on debt reduction during or following major debt increase periods ( $t+10$ ) <sup>***</sup>	0.0 (5)	3.7 (27)	47.4 (19)	-	19.6 (51)

<sup>(a)</sup> Concerns EU15 countries only.

<sup>\*</sup> Consolidations are defined as being successful if during the three years following a consolidation episode the debt-to-GDP ratio is lower by at least 5 per cent relative to the level of debt in the last year of a consolidation episode. Last year of consolidation is 2005.

<sup>\*\*</sup> Successful consolidations defined as in (<sup>\*</sup>) but extending the post-consolidation period to 5 years. Last year of consolidation is 2003.

<sup>\*\*\*</sup> Successful consolidations defined as in (<sup>\*</sup>) but extending the post-consolidation period to 10 years. Last year of consolidation is 1998. Number of consolidation episodes considered in parentheses.

successful consolidations episodes occurring in the 1990s and 2000s. This result can be explained at least partly by the general fall in interest rates in the EU during these periods as suggested earlier. The second row of Table 1 shows that consolidations following large debt increases tend to be less successful with a success rate of 24.1 per cent, which could simply reflect the fact that debt-reduction objectives are especially difficult to achieve in the wake of large debt increases episodes. Extending the time span following a consolidation episode to gauge the success or failure of fiscal consolidation from three to five years only marginally increases the success rate of consolidations as indicated by the fourth row of Table 1 while extending the time span further, *i.e.*, till 10 years after a fiscal consolidation, brings the success rate down again, possibly reflecting the occurrence of successive debt increase episodes. Table 2 reports results on the success rate of fiscal consolidations by splitting consolidation episodes into cold showers against gradual consolidations. Overall, gradual consolidations tend to be more successful, a result also in line with the existing literature, see in particular European Commission (2007).<sup>8</sup> It is worth noting, however, that the difference in the success rates between gradual consolidations and cold showers becomes much lower when considering consolidations during or immediately after large debt increase episodes as indicated by the third and fourth rows of Table 2.

While the success of fiscal consolidation seems at first sight limited, counter-factual analysis suggests that in the absence of fiscal consolidations, debt levels increased significantly more in the aftermath of large debt rises episodes. The low success rate of fiscal consolidations documented earlier could simply reflect the fact that consolidations are more often undertaken in cases where debt increases are large and starting debt levels are high.<sup>9</sup> Thus, in order to gauge the benefit of consolidation one need to take into account the initial debt level and to consider only countries that

<sup>8</sup> Gradual consolidation have also been less often implemented as indicated by the figures in parentheses indicating the frequency of consolidation episodes.

<sup>9</sup> In the polar case, countries with initially low debt level and moderate debt increase undertaking consolidation are more likely to succeed.

Table 2

**The Success Rate of Fiscal Consolidations:  
Gradual Consolidation Versus Cold Showers\*, 1970-2008<sup>(a)</sup>**

	1970s	1980s	1990s	2000s*	Overall
Gradual consolidations	42.9 (7)	41.7 (12)	62.5 (16)	50.0 (6)	51.2 (41)
Cold showers	11.1 (9)	15.6 (32)	38.5 (26)	37.5 (8)	25.3 (75)
Gradual consolidations after large debt increases*	-	50.0 (6)	0.0 (3)	0.0 (1)	30.0 (10)
Cold showers after large debt increases*	0.0 (5)	19.0 (21)	37.5 (16)	0.0 (2)	22.7 (44)

<sup>(a)</sup> Concerns EU15 countries only.

\* Consolidations are defined as being successful if during the three years following a consolidation episode the debt-to-GDP ratio is lower by at least 5 per cent relative to the level of debt in the last year of a consolidation episode. Last year of consolidation is 2005. Number of consolidation episodes considered in parentheses.

experienced large debt increases. Figure 5 illustrates this by depicting the evolution of the (average) debt-to-GDP ratio in the aftermath of a large debt increase episodes depending on whether a consolidation was or was not carried out in the EU15 during the period 1970-2007. To abstract from the differences in the initial debt level, the debt-to-GDP ratio at the end of a debt increase episode is set equal to 100 in both cases. Figure 5 shows that the post-crisis rise in the debt-to-GDP ratio is clearly more contained in cases where a fiscal consolidation was undertaken than in those where this was not the case.<sup>10</sup> These results thus suggest that consolidations, even if not successful in reducing the level debt, help containing further upward drift in debt compared to a no-consolidation scenario.

The previous results highlight that not in all instances large debt increases led to consolidation efforts by governments nor were these efforts always successful in reducing debt. The causes and context of large debt increases episodes are presumably relevant in explaining policy responses and their outcome.<sup>11</sup>

#### 4.2 Econometric approach

The existing literature has generally considered the determinants of successful fiscal consolidations separately from the decision to undertake fiscal consolidations while these two questions are likely to be closely linked, especially in a high debt environment. Our approach is

<sup>10</sup> When considering actual data underlying Figure 5, the debt-to-GDP ratio increase by 6.1 and 8.6 per cent for the three and five year time horizon respectively in case of no consolidation and by 3.4 and 4.4 per cent respectively in case a consolidation was undertaken in the aftermath of a major debt increase episode.

<sup>11</sup> For instance, as noted by Boltho and Glyn (2006) a fundamental difference exists between the consolidation efforts put in place in the 1980s (following the 1970s successive crises) and during the 1990s. During the first period, main concerns were geared towards inflationary pressures and balance of payment problems following a period of rapid rise in public expenditure. During the latter period, concerns regarding long-term debt sustainability (together with the pressure exerted by rising real interest rates at the beginning of the 1990s) became prominent, with the additional feature in the EU context linked to the run-up to EMU.

Table 3

## The Probability to Achieve Debt Reduction Versus the Decision to Consolidate

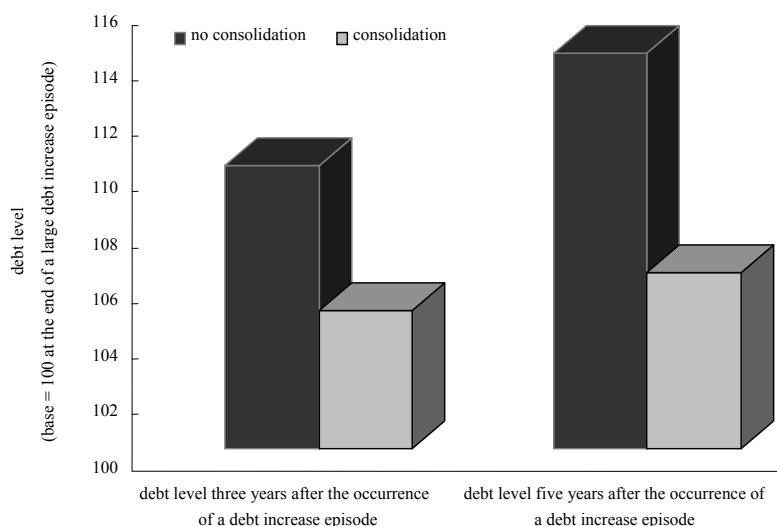
Consolidation <sup>(a)</sup>	Debt Reduction <sup>(b)</sup>	
	No	Yes
No	80.6% (518)	19.4% (125)
Yes	67.7% (159)	32.3% (76)

Figures in parentheses indicate number of country-year cases. Shaded area indicates cases where fiscal consolidations were undertaken.

<sup>(a)</sup> Improvement of the CAPB of at least 1.5 percentage points over a maximum of three years.

<sup>(b)</sup> Debt reduction of at least 5 percentage points over maximum of three years.

**Evolution of the Debt-to-GDP Ratio  
Following a Large Debt Increase Episode**



Based on major debt increase episodes as reported in Table 1.

Figure 5

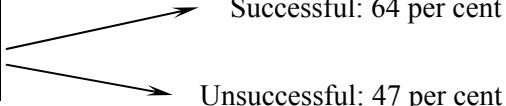
based on the premise that the determinants of the *success* of fiscal consolidation must be considered together with the factors influencing the *decision* to consolidate. This question has direct econometric implications given that the causes of fiscal consolidations are also likely to influence (at least partly) their probability of success. These questions are especially relevant to the current situation as high debt levels are likely to influence both the decision to undertake fiscal consolidation and the likelihood to achieve sufficient debt reduction which is the criterion used here to gauge the success of fiscal

consolidations. To illustrate this, Table 3 displays the observed probabilities of debt reduction depending on whether consolidation a fiscal consolidation is undertaken or not for the countries considered here. Table 3 shows in particular that a debt reduction is more likely to be achieved when a consolidation effort is carried out (*i.e.*, debt reduction is observed in 32.3 per cent of cases when a consolidation is undertaken vs. 19.4 per cent in absence of fiscal consolidation). Table 4 in turn shows that the starting debt level is higher when consolidation is undertaken, which simply

Table 4

## Starting Debt Level With and Without Consolidation

Consolidation <sup>(a)</sup>	Average Starting Debt Level
No	0.48
Yes	0.53



<sup>(a)</sup> Improvement of the CAPB of at least 1.5 percentage points over a maximum of three years.

reflects the fact that countries with higher debt may also have a greater incentive to undertake fiscal consolidation. It is thus rather logical to observe that fiscal consolidations in a context of higher debt are also more likely to be successful while this would not necessarily indicate that a higher debt favours successful fiscal consolidation. Table 3 and 4 considered together imply that the relationship between the debt level and the success of fiscal consolidation is likely to be biased upward as it may simply reflect the fact that the initial debt level tends to be higher when a debt reduction is observed for reasons which may have nothing to do with fiscal consolidation. This in turn may have direct consequences for the analysis of the determinants of successful fiscal consolidations. Ideally one would like to estimate the link between the initial debt level and the probability to achieve successful consolidation by controlling for cases where no consolidation is undertaken. In doing so one would also control for the fact that consolidations are more likely to take place with a high initial debt level.

The case for a sample selection in assessing the determinants of successful fiscal consolidations for a given level of debt could also be applied to other variables which, as the debt variable, can be thought as having an influence on the decision to consolidate and the success of consolidation. For instance, existing evidence suggested that the probability to achieve successful consolidation is facilitated with good fiscal governance, see European Commission (2007).<sup>12</sup> However, a good fiscal framework also means that consolidation is more likely for a given deterioration of public finances (keeping all other determinants constant) and debt reduction are more likely when consolidations are undertaken rather than when they are not undertaken as suggested earlier. An estimation of the role played by a fiscal governance variable for the success of consolidation might thus lead to biased estimate if such an estimate is not corrected for the influence of the quality of fiscal governance on the decision to consolidate. Generally speaking, given the above arguments, the success of fiscal consolidations cannot be considered as being the result of a random draw which is independent from the conditions influencing the undertaking of fiscal consolidations. When considering only cases where a consolidation is undertaken, one uses a draw which is in fact deterministic, leading to biased estimators. Because of this, one must also consider cases where fiscal consolidation was not undertaken as well. In order to deal with the issue of selection bias we make use of a Heckman probit two-step estimator to analyse first the determinants of the decision to consolidate and, in a second step, to estimate the determinants of successful fiscal consolidations. The following section explains in detail the estimation procedure as well as the explanatory variables retained for these estimations.

<sup>12</sup> The term “fiscal governance” (or fiscal framework) comprises all rules, regulations and procedures that impact on how the budget and its components are being prepared.

### 4.3 Main explanatory variables and equations estimated

The set of variables used to analyse the determinants of the *decision* and *success* of consolidations are the following: a dummy variable to measure the occurrence of a financial crisis episode, a variable measuring the business cycle position to deal with issues related to the timing of fiscal consolidation vs. a potential economic recovery, the debt level at the start of a fiscal consolidation episode, an indicator of fiscal governance measuring the quality of fiscal institutions, a variable controlling for cases where an IMF stabilisation programme was put in place and a variable controlling for the nature of the fiscal consolidation (*i.e.*, whether expenditure cut or tax increase based). In addition to these variables and, as commonly done when using Heckman probit estimator, we need at least one additional variable in the firsts-step estimation to explain the decision to undertake a fiscal consolidation which is not included in the second step estimation. The variable used here is a dummy indicating whether year prior or during a fiscal consolidation general elections took place in a given country. While such variable is likely to influence the decision to undertake a fiscal consolidation, its incidence on the outcome of fiscal consolidation (*i.e.*, whether fiscal consolidation leads to sufficient debt reduction) is a priori not clear. The set of explanatory variable used is summarised below. It is thus fair to believe that the occurrence of general elections is an important determinants of the first step estimation where the dependent variable is the decision to consolidate and can be excluded from the second step estimation where the dependent variable is the success of a fiscal consolidation.

The set of explanatory variables and expected impact are summarised below.

- We consider econometrically the role of financial crises as a determinant of successful fiscal consolidation including a variable indicating whether a country experienced such crisis in a given year. Following Laeven and Valencia (2008), financial crises episodes are defined in this paper as episodes during which a “*country’s corporate and financial sectors face great difficulties repaying contracts on time, experience a large number of defaults, non-performing loans increase sharply and most of the banking system capital is exhausted*”. The situation may be accompanied by falling assets prices, sharply rising real interest rates and a reversal of capital inflows. Thus, financial crises in this definition do not include banking stress limited to individual banks. However, banking crises may have coincided with and have been aggravated by episodes of currency and sovereign debt crises. Since Laeven and Valencia (2008) only define the starting points of banking crises but not their length, this paper uses for the latter the information provided in Demirgüç-Kunt and Detragiache (2005) and Reinhart and Rogoff (2008).<sup>13</sup> A dummy variable indicating whether in a given year a country was experiencing a systemic financial crisis as described in Table 8 in the Annex. In addition we include a variable indicating whether a given fiscal consolidation episode takes place in the aftermath of a financial crisis (up to 5 years).
- The business cycle position is measured using dummy variables constructed according to the values taken by the output gap during the year (*t*) when a fiscal consolidation starts. “Expansion” are years of positive output gap level and positive annual change, “Recovery” are years of negative output gap level and positive annual change, “Downturn” are years of positive output gap level and negative annual change, “Protracted slowdown” are years of a widening negative output gap level. In the current context, the most relevant episodes are the one with negative output gap levels: recovery and protracted slowdown.

<sup>13</sup> In case of missing or conflicting information in those sources, the end of the crisis was determined as the year when domestic credit growth bottomed out. Accordingly, in absence of additional indications, the end of the banking crisis episode corresponds to the year in which the private credit-to-GDP ratio recovers. Since the credit-to-GDP ratio fall often occurs with a delay, a credit ratio increase after the start of the crisis does not imply classifying the episode as lasting one year only, except if the credit-to-GDP ratio grows continuously for at least three years without interruption.

- The debt level in  $(t-1)$  where  $t$  indicates the year a fiscal consolidation takes place, enters as determinant as explained earlier together with its interaction with the differential between the nominal GDP growth and implicit interest rate paid on all outstanding public debt (*i.e.*, the snowball effect of public debt).<sup>14</sup> This effect is stronger when debt ratios are high. The role played by the starting debt level position and potential snowball effects are important to consider in the current EU context. When the no-policy change debt dynamics are less favourable, *i.e.*, with high starting debt level and deficits, or through rapidly increasing snowball effects of public debt, cold shower type of consolidations are more likely to be chosen to contain further debt rise. The debt-to-GDP ratio reflecting the incentives to consolidate and influencing the success of consolidation is thus considered as well as additional determinant of the success of fiscal consolidation together with its interaction with the differential between the growth rate of GDP and the implicit interest rate on public debt.
- An indicator of fiscal governance indicating whether or not a given country uses a budget deficit rule when setting its fiscal plans (drawing on Commission database and Guichard *et al.* (2007) for non-EU OECD countries).
- A variable indicating whether a given country is subject to IMF balance of payments assistance and conditionality in order to control for the fact that emerging economies and, depending on the period considered, some recently acceded Member States may have had additional incentives to undertake and continue a fiscal consolidation episode.
- The nature of fiscal consolidation is measured through the change between  $t-1$  and  $t+3$  of the cyclically-adjusted primary expenditure, with  $t$  being the year where a fiscal consolidation is observed.

The two equations estimated are therefore:

$$D_{i,t} = X_{i,t} + \delta \text{ general elections}_{i,t} + u_{i,t} \quad (1)$$

$$S_{i,t} = \beta X_{i,t} + v_{i,t} \quad (2)$$

Equation (1) is our *selection equation* and  $D_{i,t}$  is a dummy variable indicating whether a country  $i$  undertakes a fiscal consolidation in a given year  $t$  or not. The set of variable  $X_{i,t}$  includes all the variables listed above and, in addition to these we include a dummy variable indicating whether general elections took place during the same year or the year preceding the decision to consolidate as indicated earlier. The equation (2) describes the determinants of successful fiscal consolidations where the success is measured according to the debt level reached three years after a consolidation episode starts off. The error term  $u_{i,t}$  of equation (1) is assumed to have the classical *iid* properties while the term  $v$  is correlated with  $u$  such that:

$$\text{Corr}(u,v) = \rho \quad \text{with} \quad \rho \neq 0 \quad (3)$$

Following Heckman (1979), the two-step estimates of  $\beta$  are obtained by augmenting the regression equation with a non-selection hazard term  $m$  obtained using probit estimates of the *selection equation* (1). A test of whether  $\rho$  is significantly different from zero can also be conducted in order to check whether estimating equations (1) and (2) using the Heckman estimator is justified.

All EU27 countries are considered together with a set of non-EU OECD countries including Australia, Canada, Japan, Mexico, Norway, Switzerland, Turkey and the US. Consolidations episodes are observed for the period 1970 to 2005, where 2005 is the last year of consolidation in a consolidation episode (and 2008 the last year during which the success of a consolidation episode

<sup>14</sup> The snowball effect is also sometimes termed the debt-stabilising primary balance and is defined according to the following expression:  $\text{Debt}/\text{GDP}_{(t-1)} * (i-y)/(1+y)$ , where  $i$  is the interest rate and  $y$  is the nominal GDP growth in year  $t$ .



is gauged). Using the above definition of fiscal consolidation, we have set up a dataset of 235 consolidation episodes, with 160 consolidation episodes in the EU, of which 116 in the EU15.

#### 4.4 Main econometric results

In this section we estimate econometrically the determinants of successful fiscal consolidations as represented by equation (2) conditional on the decision to consolidate and further control for the potential bias represented by the omission of the conditions that lead countries to start a fiscal consolidation episode which are represented by the same set of variables used to explain their success and, in addition, a variable indicating whether general elections took place the same year or the year before a fiscal consolidation is observed.

The estimations of the determinants of the success of fiscal consolidation conditional on the decision to consolidate are presented in Table 5. The main result concerns the effect of systemic financial crises. According to the estimates reported in column (1) of Table 5, the occurrence of a systemic financial crisis makes it less likely for fiscal consolidations to reduce debt significantly with the probability to achieve successful fiscal consolidation being 30 per cent lower when these consolidations take place during such crises. While fiscal consolidations taking place after a financial crisis also display on average lower chances of success, the effect is somewhat lower (–24.4 per cent chances of success) but still relatively large and significant. This result thus suggests that, while fiscal consolidation must come after the banking system has been repaired in order to increase chances of success, still fiscal consolidations undertaken in the aftermath of systemic financial crises have also significantly lower chances of success.<sup>15</sup>

We now turn to the coefficient estimate for the debt variable. As suggested earlier, the coefficient on this variable is not clear a priori as a higher debt level can provide additional incentive to fiscal retrenchment but also make successful fiscal consolidation more difficult to achieve through higher debt servicing, especially when GDP growth rates/interest rates are relatively low/high. The results reported in column (1) suggest that the debt level plays a positive and significant role favoring the success of fiscal consolidations while the snowball effect exerts a counteracting (negative) influence. Using the marginal effect reported in column (1) one finds that a 25 percentage points increase in the debt-to-GDP ratio implies an increase in the probability of a successful consolidation by 15.1 per cent.<sup>16</sup> However, a higher debt level, when considered together with the snowball effect of public debt (*i.e.*, a higher differential between the nominal GDP growth rate vs. the interest rate for a given starting level of debt) can also magnify the potential negative impact of the higher debt level on the success of fiscal consolidations. Estimating the joint effect of these two variables (*i.e.*, using their estimated marginal effect and multiplying those by the respective standard deviation of these two variables) yields a combined positive effect of 7.3 per cent, *i.e.*, once the positive and negative effect of higher debt are accounted for together, the debt level appears to exert a positive albeit small influence on the probability to achieve successful fiscal consolidation.

The rest of variables display coefficient estimates which are generally in line with prior expectations and the existing literature. Expenditure-cut based consolidations tend to be more successful, a result in line with the existing literature, while consolidations episode starting during period of protracted slowdown (*i.e.*, while the output gap is negative and declining) are more likely

<sup>15</sup> We have also tested whether coefficients of the *during financial crisis* and *post financial crisis* dummy variables were significantly different using simple Wald test. We failed to reject the null according to which these two variables displayed identical coefficients (at 10 per cent).

<sup>16</sup> This figure is simply obtained by multiplying the standard deviation of the debt variable for the estimation sample by the estimated marginal effect reported in Table 6. All probabilities are estimated at the average values of the variables.

Table 5

**The Determinants of Successful Fiscal Consolidations,  
Financial Crises and the Business Cycle<sup>(a)</sup>**

Method of estimation	All Cases	All Cases	All Cases	Cold Showers <sup>(b)</sup>	Gradual <sup>(b)(c)</sup>
	(1)	(2)	(3)	(4)	(5)
	Probit <sup>(d)</sup>	Heckman Probit	Heckman Probit	Heckman Probit	Heckman Probit
During financial crisis	-0.303*** (0.040)	-0.289*** (0.083)	-0.340*** (0.067)	-0.415*** (0.098)	-0.967*** (0.009)
Post financial crisis	-0.244*** (0.060)	-0.208** (0.102)	-0.174* (0.100)	0.311** (0.135)	-0.836*** (0.033)
Cold showers	-	-	-0.075*** (0.017)	-	-
Debt	0.605*** (0.138)	0.104** (0.055)	0.140* (0.076)	1.037*** (0.283)	0.656*** (0.145)
Δ cyclically-adjusted expenditure	-0.053*** (0.013)	-0.012* (0.007)	-0.015*** (0.004)	-0.037 (0.023)	-0.029*** (0.008)
Downturn	-0.112 (0.102)	-0.045 (0.050)	-0.050 (0.038)	-0.429*** (0.067)	0.082 (0.099)
Recovery	-0.093 (0.094)	-0.069 (0.052)	-0.072 (0.050)	-0.272* (0.156)	0.037 (0.121)
Protracted slowdown	-0.210** (0.087)	-0.150** (0.052)	-0.145*** (0.038)	-0.506*** (0.141)	-0.044 (0.118)
Snowball effect of public debt	-5.687*** (1.847)	-2.068** (0.092)	-2.147*** (0.372)	-6.312** (3.137)	-7.308** (2.949)
Fiscal governance	0.050 (0.087)	0.028 (0.034)	0.0362 (0.031)	0.111 (0.121)	0.098 (0.087)
IMF programme	0.441** (0.174)	0.131** (0.042)	0.131*** (0.042)	-0.101 (0.247)	0.700*** (0.046)
$X^2(\rho=0)$	-	12.79	2.87	3.76	0.75
p-value		[0.00]	[0.09]	[0.05]	[0.388]
Observations <sup>(e)</sup>	181	824	710	181	181

<sup>(a)</sup> Marginal effect using Probit estimations, dependent variable is a dummy variable taking value 1 when consolidation is successful and 0 when it fails. \* significant at 10 per cent; \*\* significant at 5 per cent; \*\*\* significant at 1 per cent.

<sup>(b)</sup> Dependent variable success of gradual (cold shower) consolidation conditional on consolidation taking place.

<sup>(c)</sup> The coefficient on systemic financial crises variables could not be estimated due to low number of non-zero outcome for these variables.

<sup>(d)</sup> Success/failure are conditional on fiscal consolidation being undertaken.

<sup>(e)</sup> The total number of observations reported in columns (1), (4) and (5) appears to be lower than the total number of consolidation episodes available in our dataset. The reason for this is that the explanatory variables, in particular the fiscal governance variable was not available for all countries/years.

Robust standard errors in parentheses.

Table 6

**The Role of Expenditure-Cut/Tax-Revenue-Increase-Based Consolidations  
and the Business Cycle: Evidence from Heckman Probit Estimations**

	<b>Δ Cyclically-adjusted Expenditure</b>			<b>Δ Cyclically-adjusted Tax Revenues</b>		
	<b>All Consolidations</b>	<b>Cold Showers</b>	<b>Gradual Consolidations</b>	<b>All Consolidations</b>	<b>Cold Showers</b>	<b>Gradual Consolidations</b>
Downturn	−0.002 (0.017)	0.035* (0.011)	−0.093 (0.085)	0.013 (0.034)	0.014 (0.025)	0.026 (0.071)
Recovery	−0.040* (0.023)	−0.042* (0.022)	0.004 (0.093)	−0.017 (0.023)	−0.007 (0.016)	−0.160 (0.119)
Protracted Slowdown	−0.047* (0.025)	−0.069** (0.028)	−0.030 (0.047)	−0.028** (0.014)	−0.027** (0.011)	−0.113* (0.070)

Marginal effect using two-stage Heckman Probit estimations (first stage variables as indicated in Table 5, column 2 excluding “Δ cyclically-adjusted expenditure”. Dependent variable is a dummy variable taking value 1 when consolidation is successful and 0 when it fails. Success/failure are conditional on fiscal consolidation being undertaken. Robust standard errors in parentheses.

\* significant at 10 per cent; \*\* significant at 5 per cent; \*\*\* significant at 1 per cent. Only explanatory variables concerning the interaction between expenditure/revenue based consolidation and starting business cycle conditions included.

to lead to failure.<sup>17</sup> The dummy variable indicating whether countries were engaged into an IMF programme also displays a positive and significant coefficient which is also in line with our prior. Our variable measuring the quality of fiscal institutions, while playing a positive role, does not display a significant coefficient. While a priori surprising this result can be explained by the fact our measure of the quality of fiscal governance captures only one specific aspect of the quality of fiscal institutions, *i.e.*, the existence of a budget deficit rule, is rather loose and does not reflect the complexity of the role played by fiscal institution is ensuring sound budgetary outcome, see in particular Debrun *et al.* (2008). In addition, one could argue that the effect of fiscal governance may already be captured by the variable indicating the nature of fiscal consolidation to the extent that the quality of fiscal institutions reflects the commitment of governments to achieve their budgetary targets over a longer period (as in the case of gradual consolidations).

Column (2) of Table 5 shows the estimated elasticities using the two-step Heckman probit estimations of the determinants of successful fiscal consolidation (where the first step estimations concern the determinants of the decision to consolidate, results are reported in Table 4 and include as additional determinant a dummy variable indicating whether during the year preceding a consolidation episode general elections took place in the country concerned).<sup>18</sup> Interestingly, all

<sup>17</sup> It is important to note that when estimating the influence of the starting business cycle position one needs to make a choice about the benchmark cases (*i.e.*, the dummy variable to be excluded from the equation estimated). Here we use as benchmark are the cases where consolidations start during years of expansion, *i.e.*, when the economic recovery is firmly grounded. Conversely, one could also use as benchmark cases where consolidations started during years of economic recovery and therefore illustrate the trade-off between stabilisation and fiscal consolidation. We have also estimated all equations reported in Table 5 using this alternative specification. While the results were qualitatively similar (*i.e.*, years of protracted slowdown being negative and significant in most specifications), for specifications corresponding to columns (2) and (3) in Table 5 the marginal effect of the *protracted slowdown* variable, albeit still negative, was no longer significant. This suggests that our result concerning the influence of the starting business cycle condition is not totally independent of the specification used.

<sup>18</sup> Table 9 in the Annex provides results of the first stage estimations concerning the determinants of the decision to undertake fiscal consolidation and used to estimate results reported in columns (2) and (3) of Table 4.

debt-related explanatory variable now display coefficients which are clearly lower than the probit estimate reported in column (1). These results thus tend to suggest that the influence of the debt level on the success of consolidation is biased upward when not controlling for the correlation between the decision to consolidate and the likelihood to achieve successful consolidation. Considering the case of the debt level for instance, one now finds that the impact of a 25 percentage points increase in the debt-to-GDP ratio increases the probability of success by barely 2.6 per cent (against 15.1 per cent previously). The negative influence of the snowball effect is also lowered such that the combined effect of higher public debt (*i.e.*, discounting the effect of the debt level from the effect of the snowball effect) decreases on average the probability of success of fiscal consolidation by  $-1.3$  per cent. Two other coefficients estimates are also much affected by these new estimates: the positive influence of being in an IMF programme now falls down to 13.1 per cent (from 44.1 per cent previously) while influence of the nature of fiscal consolidation (*i.e.*, public expenditure-cut vs. tax revenue increase based) is much lower and only significant at 10 per cent (against 1 per cent previously). The financial crisis dummy variable and the business cycle variable remain highly significant and their marginal effect on the probability to achieve successful consolidation remains broadly similar, although more so for the financial crisis variable as these appear to exert the bigger influence on the likelihood to achieve successful fiscal consolidation. It is worth pointing out that the estimated overall probability of success increases when controlling for the sample selection bias from 26 to 30 per cent when estimating it using the Heckman two-stage procedure controlling for sample selection bias and to 36 per cent when further controlling for the lower probability of success concerning cold-shower based consolidations as in the specification of column (3) of Table 5.

We have also tested whether the use of a specification *à la* Heckman allows reducing the bias in the estimators of the determinants of successful fiscal consolidations, *i.e.*, whether the coefficient  $\rho$  of equation (3) can be considered as being significantly different from zero in which case simple probit estimators would be preferable. The  $\chi$ -square statistics for the null-hypothesis reported at the bottom row of Table 5 suggests that the one-stage probit estimator yields biased estimators and that a Heckman procedure is warranted.

#### 4.5 Fiscal consolidations, growth and the interest rate

As suggested by the descriptive analysis in Section 2 and the overview of the literature in Section 3, cold shower consolidations usually tend to be less effective than gradual consolidation when it comes to reduce debt level. Column (3) of Table 5 further extends the set of explanatory variable by including a dummy variable indicating whether the consolidation episode can be considered as a cold shower rather than a gradual consolidation according to the definition used here. The marginal effect for this variable appears to be negative and significant, suggesting that cold shower types of consolidation are effectively less likely to succeed possibly through their negative short-term effect on demand and economic activity. Despite the apparent lower probability of success, cold showers are still more often chosen compared to gradual consolidation as suggested earlier by the descriptive statistics

The estimates reported in column (1)-(3) suggest that the effect of higher debt levels is dual: on the one hand it enhances the chances of achieving successful fiscal consolidation and on the other hand it makes success more difficult through higher debt servicing costs if interest rates are large compared to nominal GDP growth. Once the selection bias related to the influence of the debt level of the decision to undertake fiscal retrenchment these effects remain somewhat subdued and tend to cancel out each other. It becomes clear that the influence of the starting debt level at the onset of a fiscal consolidation process depends much on broad monetary (*i.e.*, via the interest rates) and economic (*i.e.*, via nominal GDP growth) conditions, *i.e.*, a high debt level might or might not

compromise the chances of achieving successful fiscal consolidation depending on these conditions. Different consolidation strategies might thus be more or less warranted depending on these conditions: cold showers (gradual) consolidations will be more justified if debt levels are high (low), interest rates high (low) and GDP growth rate low (high), holding all other factors constant.

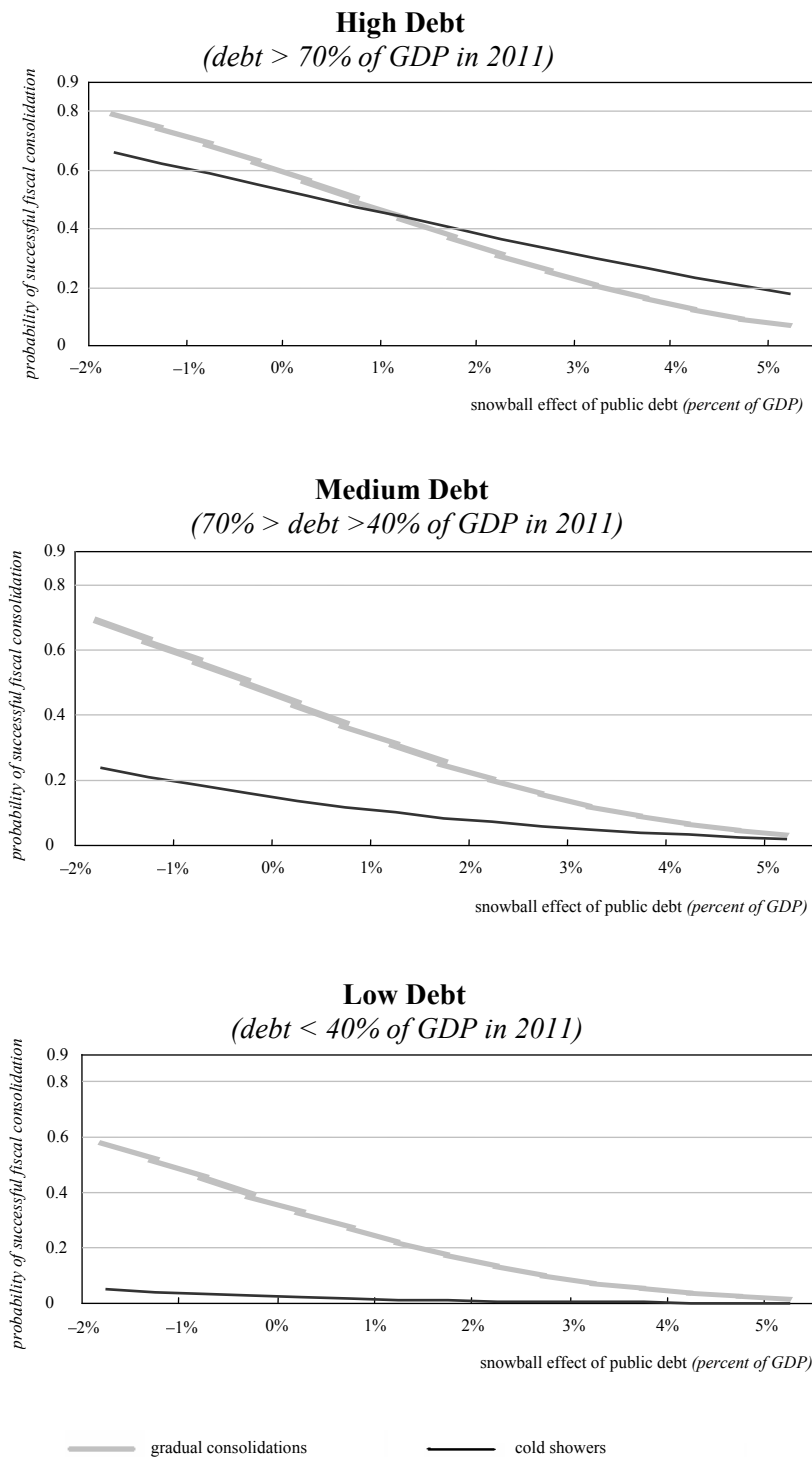
In the sequel we consider whether, depending on the debt level, gradual or cold shower types of consolidations are better suited depending on the value of the initial debt level vs. the snowball effect of public debt (which embeds the influence of the GDP growth rate and of the implicit interest rate paid on public debt). In order to be able to apply Heckman two-stage procedure we consider only cases where a consolidation was effectively implemented, therefore we do not control for cases no consolidation was implemented which may result in a higher sample selection bias compared to the general estimations reported in columns (2-3). The results of estimating separately the determinants of successful cold showers and gradual consolidations are reported in columns (4) and (5) of Table 5. The determinants of success appear to be rather different depending on whether one strategy is used instead of the other. Three results are relevant in this respect. First the influence of business cycle conditions appear to matter only for cold showers, with fiscal consolidations of this type having significantly lower chances of success when undertaken in years of downturn or protracted slowdown. Second, the negative coefficient obtained for the financial crisis and post-financial crisis dummy variable holds only for gradual consolidations while cold shower consolidations undertaken after a financial crisis is resolved have significantly higher chances of success. In addition we also used a Wald test to check whether the coefficients on the *financial crisis* and *post financial crisis* variables were statistically different and found strong evidence for this both when considering the cases cold shower (although this is already evident from the coefficients themselves) and gradual consolidations. These results thus suggest that when fiscal consolidations coincide with financial crises episodes, success is more likely if these consolidations take place after the banking sector has been repaired, and especially so in the case of cold shower types of consolidations.

The effect of the debt level and the snowball effect of public debt also seem to differ depending on whether a cold shower or gradual consolidations are undertaken. The impact of the snowball effect on the relative chances of success of gradual vs. cold shower types of consolidation is not uniform however, and depends also on the starting level of debt. In order to investigate how the level of debt and the snowball effect of public debt interact to determine whether a cold shower or a gradual type of consolidation yield better chances of success, we have estimated the probability of success of fiscal consolidations at three different values of debt for varying values of the snowball effect (from –2 to 5 per cent of GDP) holding all other variables constant (and equal to their average value) and using the estimations reported in columns (3) and (4).<sup>19</sup> Results are reported in Figure 6 distinguishing three groups of countries according to the debt level of EU countries estimated for the year 2011 (using the European Commission's *Spring 2010 Forecast*): high debt (above 70 per cent of GDP), medium debt (below 70 per cent and greater than 40 per cent of GDP) and low debt (below 40 per cent of GDP). Figure 6 shows that the cut-off point of the snowball effect beyond which gradual or cold shower consolidation yield higher probability of success differ depending on the level of debt. In high-debt countries, cold shower consolidations are more likely to succeed than gradual consolidations in reducing debt if the snowball effect is positive and greater than 1 per cent of GDP. Gradual consolidations are warranted only in cases where the snowball effect is negative or positive but very small.

<sup>19</sup> In other words, we do as if the parameters estimated were identical to the one reported in Table 2 although we only consider as explanatory variables the debt level, the three business cycle variables, the debt-stabilising primary balance and the fiscal governance variable in order to be able to compare the same model for cold shower and gradual consolidations. The range of values chosen for the debt-stabilising primary balance appear to correspond to the values observed for the countries included in the sample used to estimate results reported in Table 2.

Figure 6

**The Probability of Success  
of Gradual and Cold Shower Fiscal Consolidation  
Depending on the Snowball Effect and the Level of Debt**



Figures based on two-stage probit estimations as reported in Table 5 (specifications used correspond to columns 4 and 5).

Considering these results in the current EU context would suggest that countries that entered the 2008/2009 crisis with relatively low levels of debt but with fiscal positions substantially worsened by the current crisis (e.g., Ireland or Spain) do not appear to be exempt from pressure exerted by potential rise in interest rate and thus, despite relatively low initial level of debt before 2010, may be better off by undertaking a cold shower rather than a gradual consolidation. It is however difficult to make precise forecast about the value of the snowball effect for the post 2010 period given that this variable is highly sensitive to small changes in the interest rate and the GDP growth rate. Using the average value of the snowball effect between 2009 and 2011 as benchmark for Spain (2.5 per cent) and Ireland (4.3 per cent) for instance, these two countries would fall in the category of countries with both high debt and high snowball effect, however. In medium-debt countries, cold shower would yield higher probability of success for a snowball effect higher than 3.5 per cent of GDP. The cut-off point for the snowball effect is rather high, although it must be

noted that even above this threshold the probabilities of success of cold shower vs. gradual consolidations are both very low (around 10 per cent) in that case. In low-debt countries, cold shower consolidations are always less likely to succeed in reducing debt than gradual consolidations.

#### 4.6 *Do exchange rate depreciations favour successful fiscal consolidations?*

It has often been argued in the press and policy circles that successful fiscal consolidations in the aftermath of the global financial crisis of 2008-09 would be particularly difficult to achieve in a context of unwinding of intra-EU imbalances where, in particular, peripheral EU countries would have to face the dual challenge of containing rising debt level and to restore competitiveness problems, see European Commission (2009). Some have in addition suggested that these countries would be better off being (temporarily) outside rather than within the euro area in order to let their domestic currency depreciate and to facilitate growth-led economic recovery and, by the same token, soften the consolidation and adjustment processes, see Feldstein (2010).

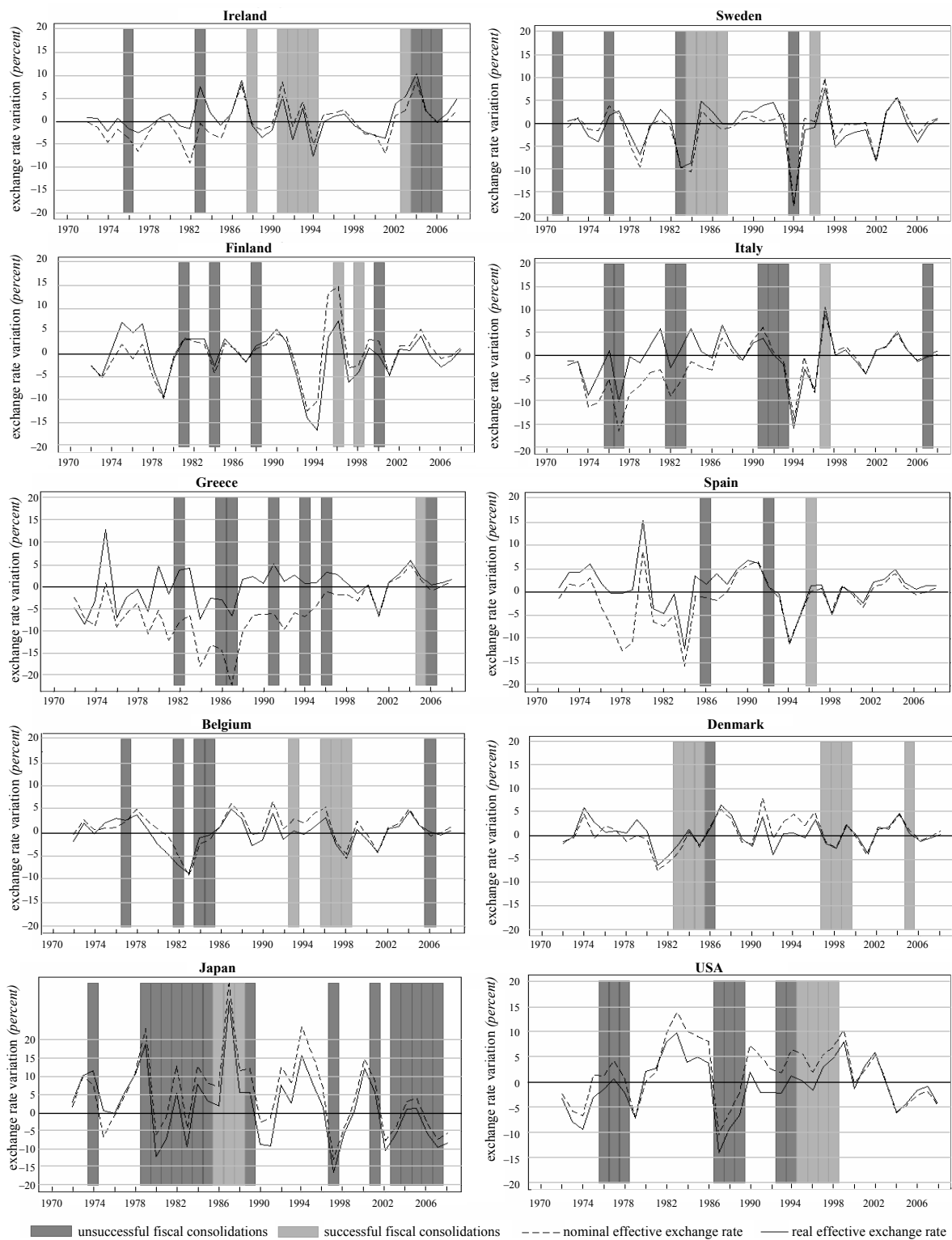
As suggested earlier, the existing evidence on the impact of exchange rate depreciation/devaluation on the success of fiscal consolidations is relatively scant and, when available, point to a significant albeit small positive effect of exchange rate depreciation/devaluations on the success of consolidations. Here we provide evidence on the link between exchange rate depreciation and the success of fiscal consolidations. Before turning to the econometric estimation, it is worth considering a number of descriptive statistics. Figure 7 plots the evolution of the annual change in the real and nominal effective exchange rate (trade weights against a sample of OECD and non-OECD countries).<sup>20</sup> Some small open economies appear to have successfully conducted fiscal consolidations while experiencing nominal and real exchange rate depreciations. Figure 7 includes evidence for Ireland and Denmark in particular, two economies often referred to in the literature as having performed successful fiscal consolidations in the wake of exchange rate devaluations during the 1980s and early 1990s respectively. Giavazzi and Pagano (1990) in particular suggested that these countries succeeded in taming down inflationary pressure related to devaluation partly thanks to their subsequent peg to the German DM which allowed them to anchor inflation expectations. Indeed fiscal consolidations appeared to be successful and were effectively preceded or coincided with nominal and real exchange rate depreciations in these countries during their respective fiscal consolidation episodes. Importantly, in both these countries the real and nominal exchange rates moved closely enough, i.e., nominal exchange rate depreciation did not translate into substantive inflationary pressure which would have the potential to cancel out the benefit of depreciation via export-led growth. The Finnish and Swedish fiscal consolidations undertaken in the aftermath of their respective financial crises in the 1990s were characterised by successful fiscal consolidations and preceded by exchange rate depreciations with, here again, a close correlation between real and nominal exchange rate suggesting that in both cases upward labour cost pressures were relatively contained.

Many more such cases can be found that provide counter-arguments to the case for exchange rate devaluations that would be needed to conduct successful fiscal consolidations. An especially interesting case illustrated in Figure 7 is Greece which, as mentioned above, has often been considered as a clear example of how the absence of the exchange rate as adjustment device was especially damaging for peripheral EU countries in the current juncture. Greece has in the past undertaken several fiscal consolidations, however these were rarely successful. Here again, the

<sup>20</sup> Nominal and real effective exchange rates are calculated using trade-weighted average of bilateral exchange rates against 30 OECD countries and seventeen non-OECD countries (Argentina, Brazil, Chile, China, Chinese Taipei, Estonia, Hong Kong, China, India, Indonesia, Israel, Malaysia, the Philippines, Russia, Singapore, Slovenia, South Africa, Russia and Thailand).

Figure 7

### Successful and Unsuccessful Fiscal Consolidations and Real and Nominal Exchange Rates Variation in Selected Sample of Countries



Source: Commission Services.



large depreciation of the nominal exchange rate in the early 1980s did not lead to successful fiscal consolidation and an explanation for this can be found in the diverging evolutions of the nominal and the real exchange rates due to inflationary pressures. One reason which could be invoked in the Greek case is that Greece, while being a relatively small EU economy, is not very open by EU standards such that the devaluation/export-led growth nexus would be less likely to yield the expected benefits in the context of fiscal consolidation. Generally speaking one can also find counter-examples of successful large consolidations without exchange rate depreciation/devaluation such as for instance the case Belgium (another small open economy) in the mid-1990s where successful consolidations were not accompanied by strong devaluations/deprecations (actually some appreciation could be observed from 1992 to 1996).

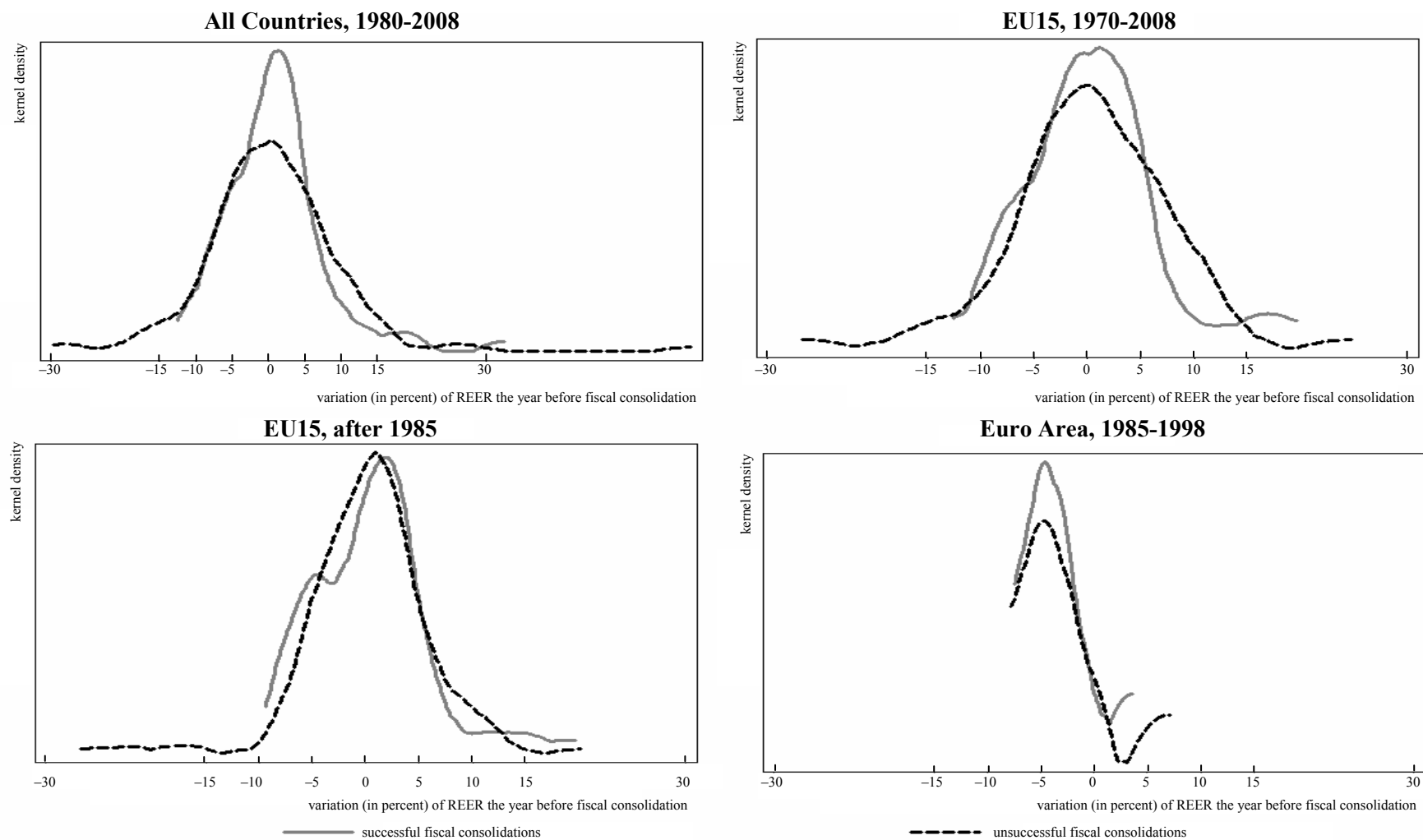
The cases of non-EU OECD economies also reflect the wide array of possible outcomes when it comes to analysing the link between exchange rate variations and the success of fiscal consolidations. For instance, in the case of Japan in the second half of the 1980s, successful fiscal consolidations were preceded or coincided with sharp exchange rate appreciations, both nominal and real. Such result would be at odd with the idea that devaluations are needed to boost export and smooth the negative impact of fiscal consolidations, even in the case of an economy like Japan where export are a key driver of economic growth. The US is another interesting cases given that this country experienced sharp devaluation in the mid-1980s (both nominal and real) but failed to achieve successful fiscal consolidations in the following years. On the contrary, fiscal consolidations in the second half of the 1990s were granted with success and were accompanied by real and nominal exchange rate appreciation.

Overall, it is rather difficult to draw a clear picture regarding the link between the success of fiscal consolidations and exchange rate evolutions prior consolidation when considering country-specific evidence in detail. Furthermore, the exchange rates used to construct Figure 7 concern bilateral exchange rate against virtually all potential trade partners. In the case of the EU, EU-wide effective exchange rates might be more appropriate, especially in relation to recent evolutions in real exchange rates within the euro area. Figure 8 provides complementary evidence in order to partly deal with these issues by plotting kernel density curves (which are equivalent to histograms) indicating the density (or frequency) of successful and unsuccessful fiscal consolidations depending on one-year lagged exchange rate percentage change (indicated in x-axis). If the kernel density curve corresponding to successful fiscal consolidations was centered around a given value of the change in the real exchange rate then this would tend to indicate that such value of the exchange rate variation is more likely to be associated with a successful fiscal consolidation. Inspection of the cases concerning all countries in the sample as indicated in the top left diagram (*i.e.*, EU27 + OECD no EU countries) suggest that in general, exchange rate variation do not exhibit any particular change before successful consolidations. The same applies when considering the EU15 (top right figure), the EU15 with EU-specific real effective exchange rates during the period after 1985 (bottom left figure). Some bias toward devaluation can be observed however for the euro area countries also during the period preceding the launch of the euro 1985-98 (bottom right figure) although, here again, the pattern of successful and unsuccessful fiscal consolidations seems fairly similar.

Several econometric tests were also performed using the Heckman two-stage probit estimation procedure and the results of these are reported in Table 7. The specification used is identical as the one employed in and several effective exchange rates are included as potential determinants together with their interaction with the exchange rate regime to which countries adhered at the time fiscal consolidation was observed using the data provided by Reinhart and

Figure 8

### Successful and Unsuccessful Fiscal Consolidations and Real Exchange Rates Variation: Evidence Using Kernel Figures



Sources: Commission Services.

Table 7

**Exchange Rate Variation, Exchange Rate Regime and the Success of Fiscal Consolidations**  
**Results from Heckman-Probit Estimations<sup>(a)</sup>**

	No Distinction of Exchange Rate Regime	Fixed/Quasi Fixed Exchange Rate Regimes <sup>(b)</sup>	Floating/Quasi Floating Exchange Rate Regimes <sup>(b)</sup>
Nominal effective exchange rate	0.003 (0.004)	0.003 (0.005)	0.003 (0.006)
Real effective exchange rate <i>Unit labour cost</i>	0.002 (0.003)	0.003 (0.005)	−0.001 (0.005)
Real effective exchange rate <i>cpi</i>	0.001 (0.005)	0.005 (0.007)	−0.005 (0.008)
Real effective exchange rate EU15 <i>Unit labour cost</i>	−0.009 (0.007)	−0.016 (0.012)	−0.004 (0.010)
Real effective exchange rate EU15 <i>cpi</i>	−0.013 (0.009)	−0.014 (0.011)	−0.008 (0.012)

Robust standard errors in parentheses.

<sup>(a)</sup> Non-reported control variables include the Debt level in  $t-1$ , Business cycle indicators for years of economic recovery downturn and protracted slowdown, an indicator on the quality of fiscal governance, snowball effect of public debt and a dummy variable indicating whether consolidation took place during a systemic financial crisis as defined in the PFR 2009.

<sup>(b)</sup> Coefficient estimates obtained using interaction term between exchange rate variable and exchange rate regime using data provided in Reinhart and Rogoff (2004).

Rogoff (2004).<sup>21</sup> This table shows that independently of the exchange rate type and countries considered, the exchange rate variation is never a significant determinant of successful fiscal consolidation. Interestingly though, in the case of the EU15 the observed sign is the expected one (*i.e.*, negative thus indicating that exchange rate depreciation tend to be associated with successful fiscal consolidation) but is never significant. Several robustness checks were performed to consider two-year instead of one-year lag in exchange rate depreciation. In addition, regressions were run for separate groups of countries according to an openness indicator (equal to the sum of export and import in percent of GDP) and also according to the export ratio to GDP ratio indicator to consider the possibility that the expected positive effect of a depreciation on the success of fiscal consolidation is more likely to take place in countries where exports have a potentially higher bearing on growth. None of these additional regressions significant coefficients on the exchange rate variables independently of the specification used.

<sup>21</sup> Reinhart and Rogoff exchange rate regime classification is used here as traditional classification (*i.e.*, IMF) have long been questioned in the literature as these rely on self-reported country information on exchange rate arrangements which may differ from practice where dual exchange rate markets may better reflect reality and, in particular, monetary policy and inflation dynamics. We thus also rely upon an alternative exchange rate classification proposed by Reinhart and Rogoff (2004) who propose instead a taxonomy based on a broad variety of statistics measuring exchange rate volatility matched to official arrangements and chronologies on exchange rate intervention to derive a “natural” grouping of exchange rates regimes taking into account of differences between announced exchange rate regime and real ones (derived from the statistics) and thus relying on market-determined rather than official exchange rate regime.

Are these results at odd with the existing literature? There are a number of reasons suggesting that this is not necessarily the case. First of all the criteria for defining successful consolidation used is not necessarily the same: for instance, Lambertini and Tavares (2005) consider a definition of successful consolidation as one where the CAPB does not fall below a given threshold after a consolidation episode is kick-started. Hjelm (2002) on the contrary, considers non-fiscal variables as indicator of success of fiscal consolidations such as private consumption, non-residential private investment, exports and changes in unemployment). Furthermore, previous analysis did not use causality analysis but rather simple statistical association or case-study analysis concerning small open economies (e.g., Alesina and Perotti, 1997) while existing evidence considering the role of devaluations/depreciations in reducing debt significantly remains inconclusive (see in particular Ahrend *et al.*, 2006).

## 5 Summary of results and policy implications

The 2008/2009 global financial crisis has seen public debt to reach unprecedented levels since the second World War prompting EU governments' actions to stem rising debt level by undertaking fiscal consolidations. In this paper we highlight a number of issues of direct relevance for fiscal consolidation in the aftermath of the financial crisis by studying the determinants of successful fiscal consolidations considering EU countries and a sample of non-EU OECD economies during the period 1970-2008. Our analysis in particular focuses on a number of important and novel aspects not yet considered in empirical studies:

- In this paper we make use of the two-stage Heckman probit estimator to obtain estimates of the determinants of successful fiscal consolidations which allow us to link the determinants of successful consolidation with the decision to start off a fiscal consolidation episode. We discuss the reasons why not controlling for sample selection bias in fiscal consolidations is important to derive meaningful policy implications, especially with regards to the role played by the starting debt level which is likely to condition the potential success of EU countries' consolidation strategies in the years to come.
- We consider explicitly the role played by systemic financial crises using information regarding financial crises duration and find evidence suggesting that restoring the financial sector is a pre-condition for achieving successful fiscal consolidations although fiscal consolidations conducted in the aftermath of financial crises tend to be significantly less successful compared to cases where no such crises took place. Our results further show that when considering separately gradual consolidations and cold shower, then it becomes clear that fiscal consolidations are significantly more likely to be successful when these are undertaken after a financial crisis is resolved, although such effect is especially apparent for the cases where cold shower consolidations are undertaken.
- We analyse the incidence of high debt levels on the success of fiscal consolidations which is a feature common to almost all EU and non-EU OECD economies in the aftermath of the 2008/2009 crisis. We show that countries facing high starting debt level and high interest rate/low GDP growth potential have better chance of achieving successful fiscal consolidations if these were sharp and sustained while other countries where such constraints are less binding would be better off by undertaking more gradual fiscal consolidations.
- Our results concerning the influence of real and nominal exchange rate depreciation/devaluations remain broadly inconclusive suggesting that the arguments according to which fiscal consolidations would be facilitated by such depreciations/devaluations in order to promote export-led growth recovery are not backed by the data.

## ANNEX

### VARIABLES DEFINITIONS AND FIRST-STAGE HECKMAN PROBIT ESTIMATION RESULTS

#### Dependent variables

**Table 3: Success of fiscal consolidation:** =1 if the debt-to-GDP ratio is lower by at least 5 percentage points three years after the start of a fiscal consolidation episode (Source: European Commission, DG ECFIN).

**Table 4: Start of fiscal consolidation episode:** =1 if  $\Delta CAPB \geq 1.5$  per cent of GDP in one year or in three years (in the latter case as long as annual  $\Delta CAPB \geq -0.5$  per cent) (Source: European Commission, DG ECFIN).

#### Explanatory variables

**Debt:** corresponds to the debt-to-GDP ratio the year a fiscal consolidation episode is started. *Source: European Commission, DG ECFIN.*

**Business cycle variables:** The business cycle is measured using output gap level and annual change: *Recovery* are years of negative output gap level and positive annual change, *Downturn* are years of positive output gap level and negative annual change, *Protracted Slowdown* are years of a widening negative output gap level. In the current context, the most relevant episodes are the one with negative output gap levels: recovery and protracted slowdown. Business cycle dummy variables are estimated against benchmark case of expansionary years which are years of positive output gap level and positive annual change (Source: European Commission, DG ECFIN).

**Financial crisis:** Financial crises episodes are defined as episodes during which a country's corporate and financial sectors face great difficulties repaying contracts on time, experience a large number of defaults, non-performing loans increase sharply and most of the banking system capital is exhausted following the study by Laeven and Valencia (2008). The situation may be accompanied by falling assets prices, sharply rising real interest rates and a reversal of capital inflows. Thus, financial crises in this definition do not include banking stress limited to individual banks. However, banking crises may have coincided with and have been aggravated by episodes of currency and sovereign debt crises. Since Laeven and Valencia only define the starting points of banking crises but not their length, this study uses for the latter the information provided in Demirgüç-Kunt and Detragiache (2005) and Reinhart and Rogoff (2008b)<sup>22</sup> (Sources: Laeven and Valencia, 2008; Demirgüç-Kunt and Detragiache, 2005; Reinhart and Rogoff, 2008; and European Commission, DG ECFIN).

**Snowball effect of public debt:** this variable corresponds to the debt-stabilising primary balance which is measured by  $\text{Debt/GDP } (t-1) * (i - y / (1 + y))$ , where  $i$ =interest rate and  $y$ =nominal GDP growth. The value of this variable the year before the start of a consolidation episode is considered (Sources: European Commission, DG ECFIN).

<sup>22</sup> In case of missing or conflicting information in those sources, the end of the crisis was determined as the year when domestic credit growth bottomed out. Accordingly, in absence of additional indications, the end of the banking crisis episode corresponds to the year in which the private credit-to-GDP ratio recovers. Since the credit-to-GDP ratio fall often occurs with a delay, a credit ratio increase after the start of the crisis does not imply classifying the episode as lasting one year only, except if the credit-to-GDP ratio grows continuously for at least three years without interruption.

Table 8

**Systemic Financial Crises Duration in EU and Other Non-EU OECD Countries**

Country	Systemic Financial Crisis Experienced During 1970-2007
Australia	-
Austria	-
Belgium	-
Bulgaria	1996-99
Canada	-
Switzerland	-
Cyprus	-
Czech republic	1996-97
Germany	
Denmark	
Spain	1977-80
Estonia	1992-95
Finland	1991-94
France	-
United Kingdom	2007
Hungary	1991-95
Ireland	-
Italy	-
Japan	1997-2002
Lithuania	1995-97
Luxembourg	-
Latvia	1995-99
Mexico	1981-82, 1994-97
Malta	-
Netherlands	-
Norway	1991-93
Poland	1992-95
Portugal	-
Romania	1990-99
Slovakia	1998-99
Slovenia	1992-94
Sweden	1991-94
Greece	-
Turkey	1982-85, 2000-03
USA	1988-91, 2007

Table 9

First-stage Heckman Probit Estimations Concerning Table 5<sup>(a)</sup>

	(2)	(3)	(4) <sup>(b)</sup>	(5) <sup>(b)</sup>
Debt	0.374** (0.190)	0.403*** (0.169)	−0.146 (0.290)	0.204 (0.325)
Downturn	0.009 (0.167)	−0.013 (0.126)	0.394* (0.226)	−0.490 (0.324)
Recovery	0.142 (0.139)	0.124 (0.138)	0.458* (0.286)	−0.546** (0.277)
Recession	0.292** (0.131)	0.272** (0.105)	0.387 (0.261)	−0.454* (0.250)
Financial crisis	0.221** (0.110)	0.227** (0.103)	0.213 (0.520)	−0.276 (0.446)
Post financial crisis	0.302 (0.213)	0.355 (0.214)	−0.127 (0.217)	0.002 (0.383)
Parliamentary elections	−0.077 (0.091)	−0.058 (0.076)	−0.125 (0.192)	−0.056 (0.189)
Fiscal governance	−0.022 (0.112)	−0.023 (0.103)	−0.293 (0.207)	0.286 (0.222)
IMF programme	−0.145 (0.194)	−0.154 (0.193)	0.309 (0.484)	−0.304 (0.433)
Snowball effect of public debt	1.671 (2.441)	2.062 (0.194)	3.191 (5.217)	−3.435 (4.862)

<sup>(a)</sup> First-step elasticities using two stage Heckman Probit estimations, dependent variable is a dummy variable taking value 1 when consolidation is implemented and 0 when it is not. Robust standard errors in parentheses.

<sup>(b)</sup> Dependent variable success of gradual (cold shower) consolidation conditional on consolidation taking place.

\* significant at 10 per cent; \*\* significant at 5 per cent; \*\*\* significant at 1 per cent.

**IMF programme:** indicates whether a given country is subject to IMF balance of payments assistance and conditionality in order to control for the fact that emerging economies and, depending on the period considered, some recently acceded Member States may have had additional incentives to undertake and continue with a fiscal consolidation (Source: IMF).

**Fiscal governance:** dummy variable indicating whether or not a given country uses a budget deficit rule (Sources: European Commission, DG ECFIN fiscal governance database and Guichard *et al.* (2007) for non-EU OECD countries).

**General elections:** dummy variable indicating whether or not general elections took place a year before in a given country (Source: The International Institute for Democracy and Electoral Assistance).

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# IMPACT OF THE GLOBAL CRISIS ON SUB-NATIONAL GOVERNMENTS' FINANCES

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## 1 Introduction

The financial crisis unleashed by the difficulties in the sub-prime mortgage markets of some industrial countries propagated quickly across the globe in the last quarter of 2008, reflecting a vicious circle of frozen credit markets, plunge in business and consumers' confidence, and sharp decline in world trade. Nearly two years after the onset of the crisis, the recovery is still not firmly entrenched in most countries (with the exception of some emerging markets) despite massive monetary and fiscal stimulus. Much has been written about the causes and effects of the crisis and its impact on the public finances of countries across the globe (see, for example, Fiscal Affairs Department, 2010; OECD, 2009; and European Commission, 2009). Most of the latter literature has focused on the impact of the crisis on the finances of federal/central governments (CGs), with significantly less analysis devoted to the effects on the finances of sub-national (regional and local) governments (SNGs). This is likely to reflect both the fact that active counter-cyclical fiscal policy responses to the crisis have been spearheaded by CGs and the lack of timely data on developments in sub-national finances in most countries around the world.

This paper focuses on the impact of the crisis on sub-national finances, utilizing qualitative information, as well as the limited quantitative one available for some countries. Following a brief review of national fiscal policy responses to the crisis and of the effects of such responses on sub-national budgets in a range of countries, the paper analyzes the various channels through which the downturn has impacted SNGs in different types of countries and their own policy responses. It finds that, while some SNGs have been able to avoid a pro-cyclical policy response, through increased support by their respective CGs and by utilizing their own available "fiscal space",<sup>1</sup> many have been forced to respond to the reduced availability of revenues and/or financing by cutting their expenditures, often on socially sensitive programs. The paper concludes with some reflections on the appropriate role of SNGs in fiscal stabilization and on reforms in intergovernmental fiscal arrangements that could facilitate such a role in a fiscally sustainable way.

## 2 National fiscal responses to the crisis

The 2008-09 global financial crisis imparted a shock to the global economy unprecedented in several decades in terms of both reach and intensity. In its latest World Economic Outlook (April 2010), the IMF estimates that world output fell in 2009 by 0.6 per cent, with the GDP of advanced economies declining on average by 3.2 per cent and that of emerging and developing countries rising by 2.4 per cent, which implies little, if any, growth in real per capita income. The crisis has taken a steep toll on living standards of vulnerable income groups, as a result of the increase in unemployment, which, especially in countries with less developed social safety nets, has pushed many families below the poverty level.

While the shock affected most countries in the world, its impact was felt in different measures by different countries, reflecting their relative vulnerabilities, in particular their degree of

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<sup>\*</sup> Formerly IMF.

<sup>\*\*</sup> IMF.

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<sup>1</sup> For a discussion of the concept of fiscal space, see Heller (2005).

trade and financial openness and exposure to sectors (such as housing, financial and automotive) most affected by the downturn in demand. These factors have also caused a wide variance in both the economic and the social effects of the crisis in different regions and localities within individual countries. For example, in the U.S. the impact of the crisis has been felt most strongly in those states (such as California, Florida, Nevada and Michigan) and cities (such as New York) where housing prices have declined more sharply, or which were more dependent on especially affected sectors, such as the automotive or financial ones. The declines in oil, metals and other basic commodities' prices from their peak levels in mid-2008 impacted more strongly countries (such as Russia, Mexico, Chile, Venezuela and Nigeria) and regions more heavily dependent on resource revenues.

The limited effectiveness of monetary policy in conditions of dysfunctional credit markets brought again to the forefront the stabilization role of fiscal policy. Depending on the intensity of the shock and their perceived availability of fiscal space, countries:

- accommodated the impact of the crisis on revenues and cyclically-sensitive expenditure (a "passive" counter-cyclical policy). Figure 1 shows the decomposition of the estimated 2009-10 budgetary expansion in the G-20 countries into endogenous factors and discretionary measures. The former include both the so-called automatic stabilizers (responses of revenues and expenditures to developments in the output gap) and other factors (such as declines in asset prices and commodity prices; and in tax compliance and enforcement);<sup>2</sup>
- adopted discretionary stimulus packages, including tax cuts and/or increases in a variety of social and infrastructure expenditure programs (discretionary or "active" counter-cyclical policy). Figure 2 shows the average composition of such packages for the countries in the G-20 group (which account for almost 90 per cent of global GDP); and
- undertook a variety of extra-budgetary or "below the line" operations (such as equity injections or purchases of troubled assets) to support public or private (financial and non-financial) enterprises. These operations are not necessarily reflected in the measures of government deficits, but they do increase the public debt. In addition, many countries provided such support through the granting of guarantees, thereby creating substantial contingent liabilities for their future budgets (see Horton *et al.*, 2009, for details).

These steps resulted in large increases in the deficits and public debt of many advanced countries and of a number of developing ones (Figure 3). These deficits were financed through the use of accumulated reserves, increased borrowing from domestic and external markets and, in many emerging and low-income countries, from multilateral lenders, such as the IMF, the World Bank and regional MDBs. However, some countries with initially high levels of deficits and debt and more limited financing possibilities, were unable to avoid a pro-cyclical fiscal tightening. This has been the case for instance in a number of countries in Central and Eastern Europe and in some countries heavily dependent on resource revenues, such as Venezuela and Ecuador (CEPAL, 2009; and IMF, 2009). More recently, market concerns about the medium-term sustainability of the increased debt have forced an early tightening of budgets in a number of advanced countries as well (e.g., in the U.K. and Southern Europe).

The escalation of public deficits and debt, which is unlikely to be reversed simply by the unwinding of temporary stimulus measures and by the foreseeable recovery of revenues as activity picks up (see Fiscal Affairs Department, 2010), will pose difficult challenges for policy makers to ensure longer-term fiscal sustainability, especially in the face of the increasing cost of pension and health systems in rapidly aging societies. Undoubtedly, given their rising share in expenditure responsibilities, SNGs will be called to make contributions towards the fiscal consolidation efforts looming ahead.

<sup>2</sup> See Brondolo (2009) for a discussion of tax compliance during crisis periods.

Figure 1

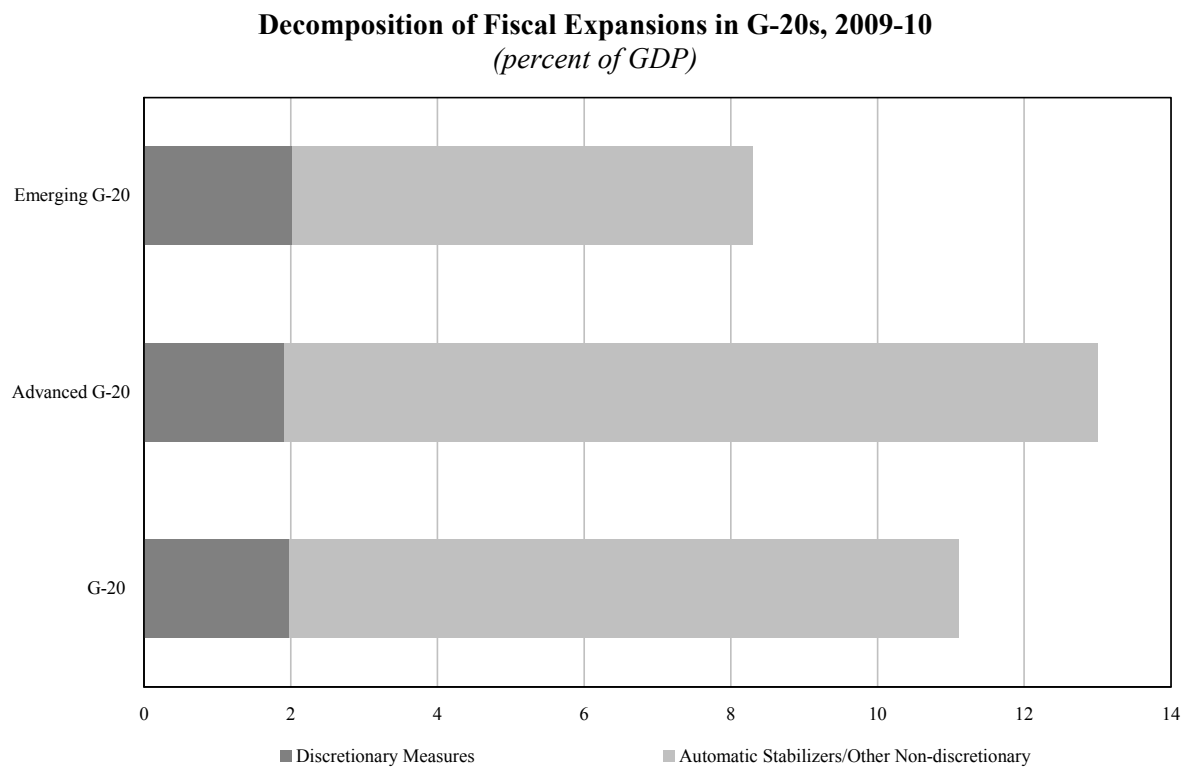
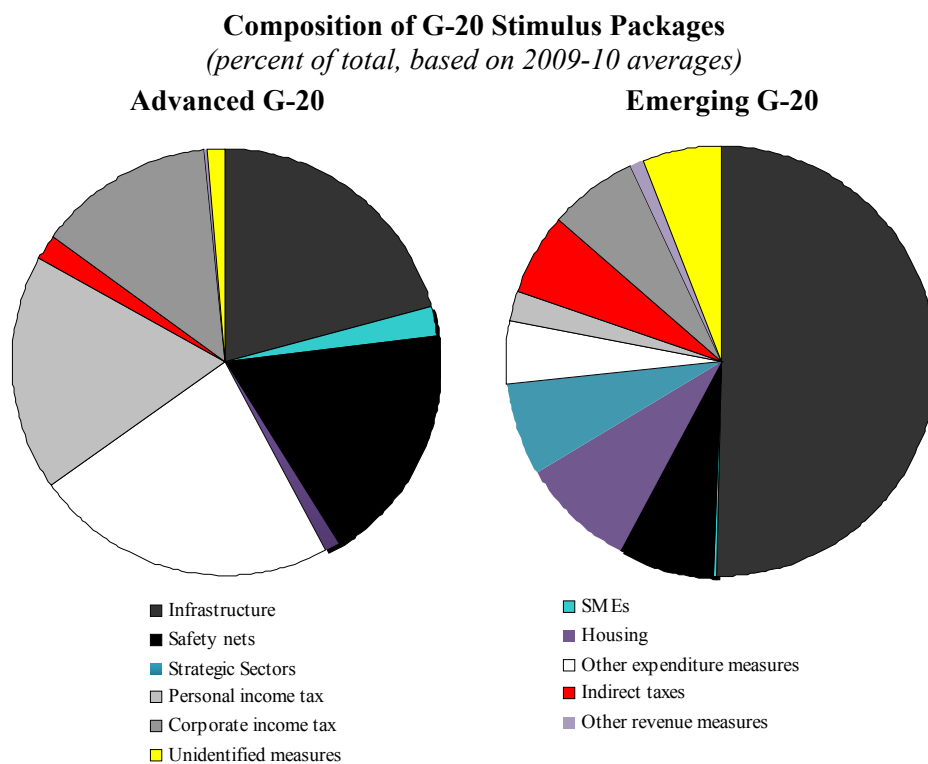
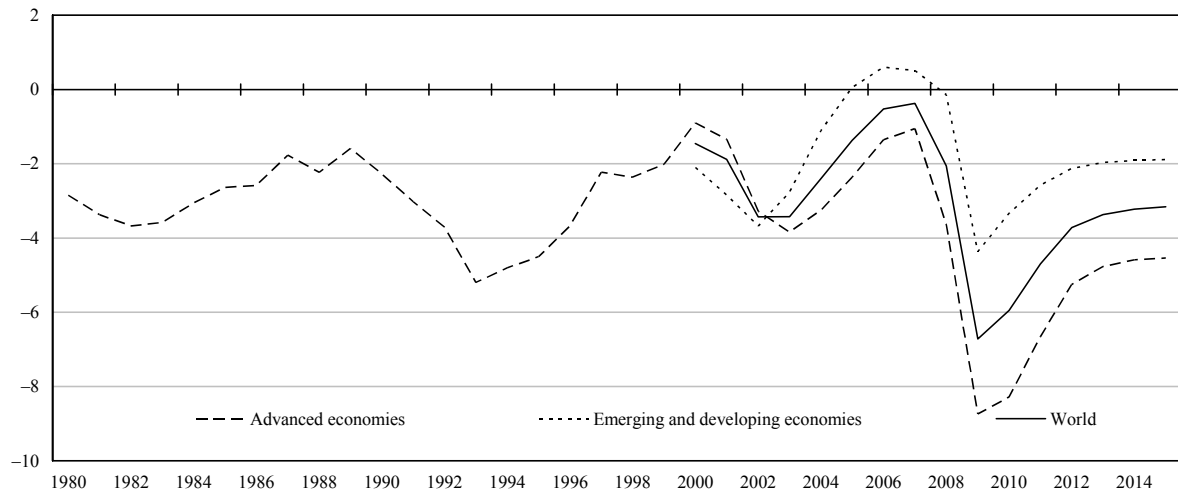


Figure 2

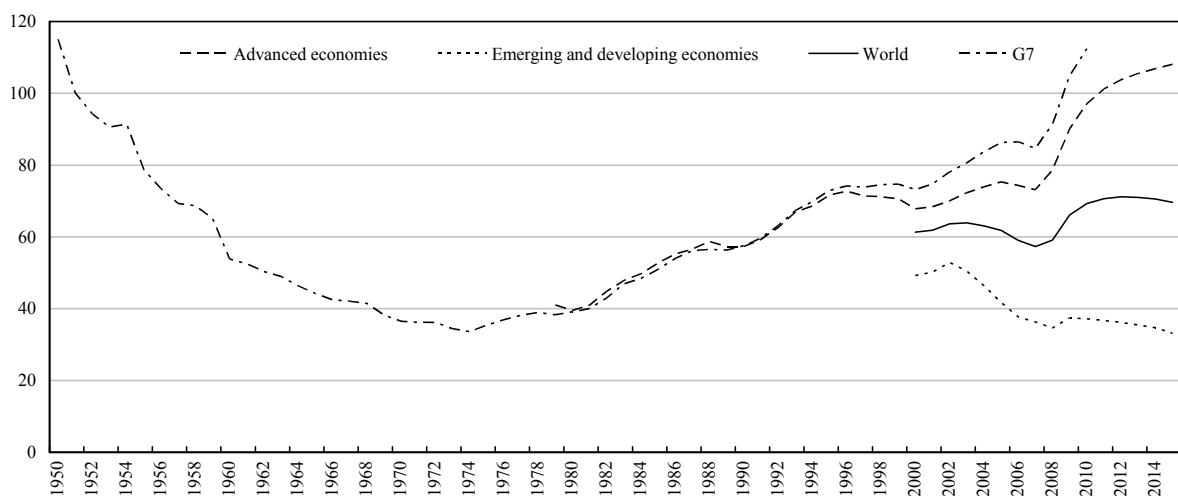


**Figure 3**

**Fiscal Balances and Public Debt, 1990-2014**  
(percent of GDP)  
**Fiscal Balance**



**Public Debt**



### 3 Effects of the crisis on SNGs' finances

The crisis has affected SNGs' finances both directly and through its impact on the budgets of CGs and their policy responses. This section of the paper reviews the various channels of impact. Unfortunately, given the significant delays with which data on SNGs' accounts become available (see Box 1 for details), most of the analysis in this section has to be based on qualitative (in some cases anecdotal) information. Boxes 2 and 3 present more specific information for, respectively, the U.S. states, where national sources of recent data are more easily available, and Brazil, where the existing Fiscal Responsibility Law requires the publication of bi-monthly summary fiscal accounts for all levels of government.

### **Box 1**

#### **Cross-country Data Sources on Sub-national Finances**

Timely and reliable information on sub-national public finances is unfortunately scarce. When available, such data are often not comparable across countries (and even within countries), and are subject in most cases to substantial delays. The lack of standardized recording and reporting practices across government levels – and even among jurisdictions at the same level – hampers the collection of sub-national fiscal statistics. The countries for which sub-national data are more easily available tend to be federal ones, with well-developed sub-national governments, thus not necessarily being representative of the majority of countries.

A few cross-country databases are available, but they offer limited coverage.

- The Government Finance Statistics (GFS) database, maintained by the International Monetary Fund, is probably the best source of internationally comparable data on fiscal variables by government level. It currently contains fiscal data for 152 countries, but includes disaggregated data on sub-national government operations for only about 60.<sup>(a)</sup> Even for those countries, however, time series are incomplete, and subject to substantial lags. Moreover, no information is available on a more disaggregated basis, thus making it impossible to analyze differences among (relevant groups of) jurisdictions within the same government level. Finally, the database does not provide information on the degree of sub-national autonomy in revenue and spending programs.
- The OECD, under its Network on Fiscal Relations across Levels of Government,, has promoted efforts to collect data on sub-national finances, and information on relevant institutional dimensions – such as the design and management of expenditure and revenue assignments, transfers and borrowing arrangements, largely based on country surveys. This information is generally limited to the 30 OECD countries.
- The EUROSTAT database on public finances includes annual data on SNGs for the EU members, but only at an aggregated level. The latest values refer to 2008.
- The World Bank, under its Decentralization Thematic Group, has made available a database on quantitative and qualitative fiscal, political and administrative variables at the sub-national level. The database provides a useful consolidated source of data, put together largely by collating information from GFS, OECD, and other sources. However, it has not been updated in recent years; and its coverage on qualitative information, for about 40 countries, remains limited.
- The Economic Commission for Latin America and the Caribbean (CEPAL) has assembled a well-developed historical database on sub-national government operations for the region, currently extending to end-2007.

<sup>(a)</sup> The tally is based on countries for which there is at least one entry over the period 2002-06.

## Box 2

### The Impact of the Crisis on the U.S. States

In the United States, virtually all states (Vermont being the exception) are mandated to balance their budgets.<sup>(a)</sup> This has proved an impossible task in the current crisis, given the spending pressures and drop in revenue induced by the crisis: in FY2009, revenues dropped significantly below levels recorded in FY2008 in virtually all states, while spending pressures, especially on social safety net programs, continued to increase. As a result, the states' budgetary gaps totaled some US\$110 billion. The gap widened further in FY2010, to around US\$ 210 billion. Part of these gaps was covered by increased transfers from the Federal Government under the American Recovery and Reinvestment Act (ARRA) of 2009, to fund additional investments, as well as selected social programs (e.g., Medicaid). The remaining gaps could only partly be filled by drawing down accumulated liquid balances (the so-called "rainy day funds"), thereby requiring varying combinations of (pro-cyclical) tax increases and spending cuts. States' contributions to pension funds for their employees were also reduced in some instances, creating (or increasing) future liabilities in this area.

California offers a dramatic example of the impact of the crisis. Its initial budget gap for FY2010 was \$24.8 billion, which, along with the US\$14.8 billion gap for FY2009, was supposed to be resolved in a February 2009 budget agreement. The resolution included five ballot measures that were rejected by voters in a May special election; meanwhile the projected budget gap continued unabated, reaching US\$60 billion by July – unprecedented in size and stemming for the largest part (80 per cent) from revenue shortfalls (California had to start issuing IOUs as means of payment to taxpayers and suppliers over the summer). The 2010 budget finally agreed between the Executive and the Legislature included wide-ranging measures to close the gap, covering revenue increases and drastic cuts in practically every state program financed by the general fund (by about US\$31 billion). Federal stimulus funds provided an additional US\$8 billion.

According to a recent report by the Center On Budget and Policy Priorities, budgetary prospects for U.S. states are worsening further in FY 2011, since the recovery is relatively subdued, the growth of personal and company incomes remains sluggish and unemployment is hardly declining. Although the overall *ex ante* budgetary gap is projected to moderate (to around US\$ 180 billion), states will be facing also a sharp decline in support from the federal government, given the expiration of ARRA and Congress' refusal to date to extend the funding of Medicaid for unemployed workers. Thus, most states' approved budgets for FY2011 include further substantial cuts in social assistance and education programs (with attendant layoffs of state employees), as well as in a number of cases increases in sales, excise taxes and user fees, or cuts in tax exemptions.

<sup>(a)</sup> These rules have constitutional or statutory basis and apply *ex ante* (beginning-of-the-year) or *ex post* (end-of-the-year). They limit ability to run deficits in the state's "general fund;" other funds – capital, pensions and social insurance – can be used as potential sources of deficit financing. For more detail, see Bohn and Inman (1996). Most states' fiscal years begin on July 1 of the preceding calendar year.



### **Box 3**

#### **Preliminary Evidence on the Impact of the Crisis on SNGs in Brazil**

In contrast with many advanced and most developing countries, Brazil compiles and publishes bi-monthly summary budgetary accounts of states and municipalities. These accounts complement the monthly cash accounts of the federal government, published by the National Treasury, and the monthly below-the-line accounts of the public sector (disaggregated by level of government) published by the Central Bank. This commendable, but unfortunately uncommon, wealth of information on sub-national finances is the result of the Fiscal Responsibility Law, enacted in 2001, which established standardized accounting and reporting requirements for each entity of the Federation.

The impact of the global financial crisis on Brazil's economy was intense but relatively short, with a recovery starting already in the second quarter of 2009. As a result, GDP fell only modestly (by 0.2 per cent on average in 2009) and is projected to grow strongly again in 2010. The primary surplus of the consolidated non-financial public sector (NFPS) deteriorated significantly (from around 3.5 per cent of GDP in 2008 to around 2 per cent of GDP in 2009), reflecting both the operation of automatic stabilizers and discretionary stimulus measures (selected temporary tax reductions and significant increases in both current and capital spending). However, the deterioration in the fiscal accounts was more pronounced in the federal than in the sub-national budgets. The primary surplus of the CG fell by the equivalent of 1 percentage point of GDP while the consolidated primary surplus of the states declined by only 0.3 per cent of GDP and that of municipalities was nearly unchanged from the previous year. Restrictions on sub-national borrowing, stemming from the existing debt refinancing agreements with the federal government, limited the extent to which states and municipalities could accommodate the cyclical decline in own and shared revenues, requiring some pro-cyclical adjustment in spending in most of them. States more dependent on revenues shared with the federal government were comparatively more affected, as in general own revenues of the states (mainly the VAT-type ICMS) and municipalities (in particular the tax on services) outperformed shared ones. Some of the larger states intensified their programs of concessions, to complement increased spending on infrastructure.

Available data for the first five months of 2010 indicate that the fiscal performance of the SNGs (as well as of the federal government) broadly stabilized at the level of 2009, despite the pronounced recovery in activity, pointing to a pro-cyclical stance of fiscal policy during the upturn, as well as the downturn, phase of the cycle.

### 3.1 *Effects of national fiscal responses on sub-national finances*

The significant increase over the last decades in the shares of SNGs in total general government expenditures (which currently exceed 30 per cent on average and 60 per cent for capital spending in the OECD area) has implied that a sizable part of stimulus spending, albeit decided and financed by CGs, had to be executed by SNGs. The capacity of individual sub-national jurisdictions to execute quickly and efficiently the additional spending affected significantly the effectiveness of stimulus packages. Predictably, measures focusing on support to households through various social expenditure programs were implemented more quickly than infrastructure investments. A number of countries (e.g., Australia, Canada, France and the U.S.) took steps to speed up regional and local implementation of the additional spending by, *inter alia*, simplifying procedures for approval and disbursement of the additional CG transfers earmarked for the stimulus expenditures; stipulating short sunset clauses and setting up strengthened monitoring procedures for the utilization of the funds by SNGs; and through other financial incentives (e.g., the French Fonds de Compensation de la TVA).<sup>3</sup> A reliable assessment of the success of such steps will, however, have to await the publication of outturn data for SNGs' operations. Even more difficult would be an assessment of the extent to which quality may have been traded off for speed in the implementation of investment projects.

On the revenue side, some tax measures implemented by CGs as part of stimulus packages involved losses of shared revenues for sub-national budgets. These losses were not always fully compensated by increased transfers from the CG to the affected SNGs (e.g., the abolition of the local business tax in France; the temporary cut in the excise (IPI) tax on automobiles in Brazil). More importantly, SNGs' budgets in many countries were adversely affected by losses in shared CG revenues entailed by the operation of the automatic stabilizers and the other factors mentioned in Section 2 above. As in many countries shared revenues account for more than half of the total tax revenues of regional governments (less for local governments),<sup>4</sup> a passive counter-cyclical policy by the CG, accommodating the endogenous decline in its revenues, would shift a significant part of the revenue loss to the SNGs, unless compensated by increased transfers to the latter. Although little firm quantitative evidence is available yet, it is likely that losses in shared revenues were more pronounced in countries relatively more affected by the cyclical downturn and/or by commodity price declines, or with larger automatic stabilizers.

### 3.2 *Direct effects of the crisis on SNGs' budgets*

The crisis also impacted sub-national budgets directly, through a number of channels:

- declines in the bases of own (income, sales or property) taxes, induced by falls in aggregate demand, output and employment; asset prices (especially real estate); and commodity prices (for resource revenues-dependent regions);
- A weakening of tax compliance by liquidity- and financing-constrained taxpayers; and possibly political pressures on tax authorities to ease enforcement on such taxpayers;
- upward pressure on cyclically-sensitive sub-national spending programs, such as assistance to the rising number of unemployed or families falling under poverty thresholds;
- pressures to bail out financial and non-financial enterprises, either publicly owned or deemed of strategic importance to regional or local economies;

<sup>3</sup> The Fonds de Compensation de la TVA has been set up by the French government to fund accelerated VAT refunds to SNGs that commit to increase investments above their average 2004-07 levels. See Dexia (2009).

<sup>4</sup> According to OECD estimates, shared revenues account for about 47 per cent of total state revenues, and for 33 per cent of local revenues in the OECD area. These figures are likely to be higher on average for non-OECD countries.

- increases in interest payments, reflecting higher financing needs and/or financing costs;
- in some cases (e.g., some states and municipalities in the U.S., U.K. and France), losses on financial investments, including of pension funds for state or local employees, or on structured loans.<sup>5</sup>

The severity of these impacts on individual SNGs is likely to have varied significantly across and within countries, reflecting in particular:

- the extent of the decline in regional/local output and employment, as explained in Section 2 above;
- the structure of own revenues, with regions relatively more dependent on resource revenues, or on business taxes, comparatively more affected;
- the extent of sub-national responsibility for more cyclically sensitive expenditures, for example unemployment compensation (which in most countries is a CG responsibility, but in some others, such as the U.S., is shared with state governments); and
- the structure of the sub-national debt, with SNGs having debts of shorter average maturities and at variable rates, or (in countries with depreciating currencies) debts denominated in foreign currency, comparatively worse off.

#### 4 SNGs' policy responses

Policy responses by SNGs to the crisis have ranged widely, reflecting not only the extent and expected duration of the shock, but also a number of other factors, in particular:

- the nature and extent of support by the CG;
- the degree of autonomy of different SNGs in revenue-raising and spending decisions;
- the presence or absence of binding legal constraints on sub-national deficits and debt;
- the existence, or not, of accumulated reserves to finance higher deficits;
- the availability and cost of additional market or official financing.

The varying combined impact of these factors facilitated an active, or at least a passive, countercyclical stance by some SNGs, but required a pro-cyclical one by others. This section discusses some of the factors in greater detail and illustrates through some representative examples the range of sub-national policy responses to date.

##### 4.1 Increased CG support to SNGs

Increased budgetary support by CGs to their sub-national jurisdictions has taken different forms across countries:

- *Increases in general-purpose or earmarked transfers*

Increases in general purpose transfers (which in principle could include temporary modifications of revenue-sharing formulas) have the advantage of greater transparency in the allocation of additional resources across regions and localities; and also of greater respect of sub-national autonomy in spending decisions. On the other hand, increases in general purpose-transfers (or changes in revenue-sharing arrangements) may be more difficult to reverse during the upturn of the cycle than those in transfers earmarked to fund specific stimulus

<sup>5</sup> Munnell *et al.* (2008) present an interesting analysis of the impact of the financial crisis on defined benefits pension plans of state and local governments in the U.S.

measures. They are also less appropriate to compensate for asymmetric effects of the crisis across SNGs within a country.

In contrast, special-purpose transfers facilitate the targeting of the increased support by the CG to the most impacted regions and localities, as well as the coordination of stimulus spending programs across government levels. They are, however, more easily subject to political manipulation, unless the criteria for their allocation and their use by recipient jurisdictions, are clearly spelled out and can be adequately monitored and enforced (which is not frequently the case, given the data limitations mentioned above).

A survey of its members by the OECD (2010) suggests that national governments in the area preferred earmarked transfers to general-purpose ones, the latter having been chosen only by Japan and the Scandinavian countries (for example, Finland raised the local governments' share of the corporate tax from 22 per cent to 32 per cent for the period 2009-11). Outside the OECD area, Russia also increased general-purpose transfers, alongside special-purpose ones, and Argentina raised temporarily the share of its export tax devoted to the provinces. The increased special-purpose transfers were used mainly to fund additional investment projects, and in some cases were targeted to regions especially affected by the crisis. As indicated in Section 2 above, some countries, such as Australia, took steps to strengthen existing mechanisms to monitor the use of the increased transfers by the recipient governments.

- *Temporary easing of legal borrowing constraints on SNGs*

Some CGs took steps to suspend balanced budget rules, or to temporarily ease budget or debt limits for SNGs, to allow them to accommodate wholly or partly the impact of the recession on their finances. For example, Sweden replaced temporarily the balanced budget rule for local governments with a less stringent "sound financial management" requirement. Spain passed legislation to allow municipalities to borrow in the market to settle arrears to their suppliers. Argentina enacted a new, significantly watered down, version of its Fiscal Responsibility Law. In Italy, as part of the anti-crisis package passed in early 2009, the Domestic Stability Pact – the set of rules governing sub-national fiscal behavior – was modified to provide some room for counter-cyclical policies, by allowing the exclusion of some additional expenditure from defined spending limits and the sale of assets to meet debt obligations. The experience of China, where the CG issued bonds for the provinces, is briefly described in Box 4. Finally, in some other countries, CGs simply did not react to breaches by their SNGs of existing debt or deficit limits.

While such approaches may have been instrumental in avoiding a pro-cyclical fiscal stance by SNGs in a number of countries, they involve significant moral hazard risks, potentially harming the credibility of fiscal rules and fiscal responsibility legislations in the future. Temporary suspensions of fiscal rules may not be easily reversed during the next upturn of the cycle, which argues for more permanent changes in the fiscal framework that would explicitly facilitate counter-cyclical responses in the future (see Section 5). Finally, a removal (or easing) of legal constraints on borrowing may not provide effective relief to SNGs, if they face market constraints on such borrowing.

- *Increased CG financing of SNGs*

A number of national governments moved to facilitate the financing of increased sub-national deficits through direct loans to their SNGs, or through guarantees of SNGs' borrowing from market or official (e.g., multilateral development banks) sources. For example, the Canadian government approved CAN\$ 2 billion in subsidized loans to municipalities, to finance improvements in housing-related infrastructure. The U.S. federal government subsidized (as part of its stimulus package) the so-called Build America Bonds, to fund a range of state and local infrastructure projects. Similar mechanisms were introduced in Switzerland. Brazil offered credits at below market terms to its states as a partial compensation for the loss of shared IPI

#### **BOX 4**

##### **China's Relaxation of Sub-national Borrowing Constraints**

Local governments in China are in principle subject to strict borrowing constraints. According to the 1994 Budget Law, local governments are not allowed to borrow from banks or issue bonds without prior authorization of the State Council. Similarly, the 1995 Guarantee Law requires prior authorization of the State Council for issuance of guarantees. On-lending from the central government has been the main financing channel available to local governments, mainly via external loans and treasury bonds issued by the central government.<sup>(a)</sup> This channel has been used more intensely in the years following the 1998 Asian crisis, in particular to finance investment projects in specific sectors.

In 2009, as part of the fiscal stimulus measures, the central government decided to issue "sub-national government bonds" in the amount of RMB 200 billion (US\$30 billion). These bonds represent a novelty, as the issuer and debtor is nominally a provincial government, but the Ministry of Finance actually issues the bonds and guarantees principal and interest payments. According to the government, this initiative offers several advantages, compared to on-lending. These bonds can be more transparently recorded as sub-national liabilities; at the same time, the issuance by the central government lowers financing costs for sub-nationals; finally, the central government has more expertise in this area, thus ensuring some efficiency and promoting uniformity and common treatment in these transactions.

<sup>(a)</sup> On-lent resources are usually earmarked for capital projects and disbursed directly to the project management; in these cases, the local government acts as a guarantor.

Source: China Ministry of Finance, 2009.

revenues resulting from selective cuts in that tax. Australia stepped up its guarantees for market borrowing by the states.

Interventions of this type may provide effective temporary relief for SNGs affected by the credit crunch, but pose moral hazard risks and should be granted only on the basis of fully transparent criteria, to avoid the risk of being used for political favoritism. At a minimum, CGs should create the right incentives for SNGs to repay these loans in the future by requiring adequate collateral (e.g., by allowing the withholding of shared revenues or other inter-governmental transfers to defaulting jurisdictions, as is done in Brazil).

#### *4.2 SNGs' options to increase financing*

A number of options are in principle available to SNGs to finance automatic or discretionary revenue reductions and/or expenditure increases. The availability and extent of these options in practice is likely to vary widely across and within countries, reflecting a range of economic and institutional factors. These options include:

- the launching of new public-private partnerships (PPPs) to fund planned expansion or maintenance of infrastructure. PPPs can be a useful mechanism to involve the private sector in

infrastructure projects, but, to ensure the desired efficiency gains from the partnerships, they need to be well structured, with an appropriate sharing of risks between the private and the public partners, and therefore require substantial know-how and lead-time for preparation. (Hemming, 2006) As such, they are unlikely to be usable on a significant scale for counter-cyclical sub-national investments;

- the launching of new concessions for the operation and maintenance of existing infrastructure. Although less demanding than new PPPs, these contracts also require significant local negotiating capacity and time;
- sales of existing sub-national real assets (e.g., buildings). The scope of this option may be limited during a crisis like the recent one, in which real estate values fell steeply in many countries;
- use of accumulated financial assets or bank balances (e.g., the so-called “rainy day funds”).<sup>6</sup> This option may also be constrained by financial market conditions (*i.e.*, to avoid fire sales of the assets). Moreover, the experience so far in the U.S. states suggests that rainy day funds were not sufficient to finance the increases in deficits originated by the crisis. In any event, it is important that the use of such funds be guided by transparent criteria, specified in advance of the crisis, leaving little room for discretion, for example in the decision to start drawing on the fund and the speed of its utilization. In some other countries (for example, Colombia and Indonesia) previously accumulated cash balances have provided a useful buffer to mitigate the impact of the crisis;
- increased borrowing. As indicated above, this option may be more or less severely constrained by existing legal limitations. Even in the absence of such limitations, market conditions are likely to affect adversely the availability and terms of sub-national borrowing during a financial crisis. This was vividly demonstrated by the financing difficulties experienced by some U.S. states (e.g., California) and municipalities (that witnessed a sudden collapse of the municipal bond market in the peak months of the crisis). Finally, even if not constrained by statutory limits and/or market conditions, increased borrowing should only be undertaken by SNGs to the extent consistent with their medium-term debt sustainability. This of course implies that SNGs with initially low and well structured debts are better positioned to avoid pro-cyclical fiscal responses to a crisis like the recent one.

#### 4.3 Counter-cyclical fiscal responses by SNGs

A number of SNGs used their available fiscal space – whether created by increased CG support, use of various financing options, or a combination thereof – to respond to the global financial crisis in a counter-cyclical way. In some cases (e.g., Denmark and Korea), this involved simply accommodating the operation of the automatic stabilizers discussed in Section 3 above (a passive counter-cyclical response). But others engaged in more active fiscal stimulus measures, through reductions in own taxes and/or discretionary spending increases.

In the OECD area, examples of counter-cyclical sub-national tax cuts can be found in Canada, Japan and Switzerland, as well as in some EU members (see OECD, 2010 for details). In general, tax reductions at the sub-national level would seem to be less efficient stimulus instruments than spending increases of equivalent cost to the budget. This is the case not only because multipliers tend to be higher for spending than tax measures, but also because tax cuts may promote a “race to the bottom” in sub-national taxation (which is already relatively low in most countries). Moreover, measures involving increases in exemptions or preferential treatments under

<sup>6</sup> See Balassone *et al.* (2007), for an analysis of experiences with rainy day funds.

existing sub-national taxes reduce horizontal equity and strain the already limited resources of sub-national tax administrations.

Discretionary spending increases (sometimes as local counterpart for CGs' stimulus spending programs) were implemented by SNGs in a wide range of countries, both inside and outside the OECD area. They tended to focus in particular on: infrastructure investment, improvements in social assistance programs and, in some cases, support to local enterprises. The latter can in principle be effective in providing temporary, targeted support to activity and employment in especially affected, but ultimately viable, sectors. But, in practice it is often difficult to avoid that the support becomes entrenched and props up ultimately unviable firms.

#### 4.4 *Pro-cyclical policy responses by SNGs*

Binding (statutory or market) financing constraints forced, however, pro-cyclical responses by many SNGs worldwide. These included both measures to boost own revenues and selective cuts in spending programs. The former ranged from increases in the rates of sub-national taxes, to reductions in exemptions, to increases in non-tax revenues, such as user fees. Rates increases (especially in excises on tobacco, alcohol, luxury goods and services, and out of state purchases; and in business and property taxes) were enacted by some SNGs in Australia, France, Sweden, the U.K. and the U.S. But more prevalent have been selective cuts in expenditure programs, including postponement of some previously planned investments. The composition of such cuts has been influenced in some cases by institutional rigidities, such as the entitlement nature of some spending programs, earmarking provisions, or other legal restrictions (such as the requirement that California devote a fixed share of its budget to education). Many SNGs implemented hiring freezes and/or used available flexibility in their employment legislation to enact layoffs of civil servants on their payroll.

## 5 **Lessons from experience**

As noted above, the recent global crisis has brought once again to the fore the stabilization function of fiscal policy. At the same time, it has rekindled a long-standing debate about the appropriate role of SNGs in this function. The traditional view in the literature (first put forward by Musgrave in his seminal textbook of 1959) has been that the comparative advantage of SNGs is in resource allocation; redistribution and, even more, economic stabilization are best carried out by the CG. Under this approach, SNGs should refrain from active counter-cyclical fiscal policies, although they may act as agents of the CG in carrying out expenditure stimulus measures decided and funded by the latter. This view reflects a number of considerations:

- first, the need to coordinate fiscal stabilization with other macroeconomic policies, notably monetary and exchange rate ones, that are a prerogative of CGs;
- second, the risk that SNGs engage in counter-cyclical fiscal expansions even if they do not have adequate fiscal space for such policies, a risk heightened by the "common pool" problem and by any perceived likelihood of eventual bailouts by the CG;
- third, the likelihood of significant leakages in the effects of sub-national countercyclical policies in an economic space (the nation) that is typically characterized by high mobility of goods and factors of production;
- fourth, the risks of adverse spillovers of individual SNGs' actions on other jurisdictions. For example, during a recession, some SNGs could engage in predatory tax competition, to bid away dwindling investment and job creation opportunities from other SNGs. Also, excessive borrowing, especially by large SNGs, to finance counter-cyclical spending could put upward

pressure on domestic interest rates, or lead to a generalized deterioration of spreads for the whole country;

- fifth, the fact that typically CGs have greater access to financing, and at better terms, than their SNGs, and therefore are better placed to finance countercyclical fiscal expansions during downturns;
- finally, the fact that CGs can redistribute budgetary resources across their SNGs, to counteract asymmetries in exogenous shocks affecting lower-level governments.

While these considerations are very significant, there are also counterarguments that are acquiring increasing importance as decentralization progresses around the world:

- first, with decentralization reducing CGs' share of total public spending and concentrating it in the less flexible expenditure categories, such as pensions and interest payments, CGs' scope for conducting counter-cyclical expenditure policies on their own is being progressively eroded;
- second, as demonstrated by the experiences of many SNGs discussed in the preceding sections, the impact of counter-cyclical policies of CGs can be significantly offset by pro-cyclical policies of SNGs;
- third, an approach that places the whole burden of economic stabilization on CGs' budgets undermines incentives for SNGs to build both fiscal space and institutional capacity to respond to cyclical developments and exogenous shocks;
- finally, sub-national fiscal responses to regionally asymmetric shocks (such as a decline in commodity prices) may be appropriate if the CG's response to the shocks does not properly take into account such asymmetries. Political economy considerations point to a risk that, in deciding the regional distribution of discretionary counter-cyclical measures, a CG may be unduly influenced by factors such as the political alignment of individual sub-national jurisdictions with the center. Even if the CG's countercyclical response takes the form of an increase in non-discretionary transfers, the allocation formula for such transfers across jurisdictions may not take adequately into account asymmetric effects of the shock.

Given the considerations above, we would argue that a more balanced view of the respective roles of CGs and SNGs is called for, especially in federal countries and in unitary ones that are characterized by relatively high degrees of fiscal decentralization. Such a view would center on the following main principles:

- first, it is increasingly crucial to minimize pro-cyclicality in sub-national budgetary policies. This would require SNGs to accommodate the operations of automatic revenue stabilizers, by saving the fiscal dividends of booms and sustaining expenditure levels in the face of cyclical revenue downturns. The case for such "passive" counter-cyclical policies rests on economic, as well as social, reasons. There is substantial empirical evidence (albeit mainly at the CG level)<sup>7</sup> that pro-cyclicality tends to be stronger during upswings than during downswings, with upward ratchet effects on deficits and the public debt. Thus, minimizing pro-cyclicality also helps promote more sustainable fiscal positions over the longer term. Moreover, sharp fluctuations in public expenditure programs tend to have significant efficiency costs. This is evident in the losses generated by delays or cancellation of already initiated sub-national investment projects; but efficiency costs of abrupt changes in funding levels can be also significant for current expenditure programs, e.g., in education and health, which are increasingly a responsibility of sub-national governments. Finally, sharp retrenchments in socially sensitive sub-national spending programs during cyclical downturns can carry substantial social and political costs;

<sup>7</sup> See, e.g., Balassone and Kumar (2007).



- second, there may be a case for “active” (discretionary) countercyclical sub-national fiscal measures to respond to regionally differentiated shocks across a national territory, especially if the CG response does not adequately take into account such asymmetries;
- third, it is essential to ensure that sub-national counter-cyclical policies:
  - are consistent with longer-term debt sustainability (see further below)
  - are symmetric over the cycle (*i.e.*, equally restrictive during booms as accommodative during downturns)
  - do not conflict with the fiscal stance of the CG; and
  - do not impose significant adverse externalities on other sub-national jurisdictions;
- fourth, it is important that SNGs build up their capacity to design and implement active countercyclical measures, when appropriate, in a transparent, relatively rapid and reasonably efficient manner, for instance by improving the targeting of their social safety nets, as well as their systems to select and execute public investments. This is the case also for countercyclical measures executed by SNGs on behalf of, and funded by, the CG. SNGs’ capacity weaknesses in this respect have often hindered the timeliness and effectiveness of CGs’ countercyclical fiscal policies in many countries.

The challenge is to design or reform inter-governmental fiscal arrangements so as to promote sub-national fiscal policies consistent with such principles. Although, of course, such reforms should be tailored to individual countries’ economic, political, social and institutional circumstances, a number of steps could help in this area:

- sub-national fiscal rules mandating the running of surpluses during boom periods, to build-up adequate reserves to finance cyclical deficits during downturns. The design of such rules is not a simple matter, especially in view of data limitations that hinder reliable calculations of the cyclical component of sub-national budgets.<sup>8</sup> Nevertheless, approximate indicators, based on estimates of the national cycle, may be better than unadjusted balances to minimize pro-cyclicality in sub-national budgets. As an alternative, a combination of expenditure- and debt-based rules can help promote savings of revenue over-performance during boom periods and facilitate a sustainable countercyclical expansion during downturns;
- the creation, or strengthening, of institutional mechanisms to promote coordination of budgetary policies across government levels (such as exist in Australia, Germany and Spain to name a few). Discussions in such forums could include the coordination of planned sub-national tax measures, to minimize adverse inter-jurisdictional spillovers; and the identification of a pipeline of well-prepared investment projects – to be funded by the CG (or co-financed with SNGs) and implemented by the SNGs – that could be activated quickly as part of a counter-cyclical fiscal stimulus package;
- the (partial or total) assignment to SNGs of revenue bases (such as personal incomes and property) that tend to be relatively less elastic to the cycle. Similarly, the assignment to the CG of responsibility for expenditure programs (such as unemployment insurance) that are especially sensitive to the cycle;
- the introduction of smoothing (*e.g.*, use of a moving average of CG revenues) or other counter-cyclical mechanisms in revenue-sharing formulas;
- strengthened cooperation between national and sub-national tax administrations, (*e.g.*, through use of a common taxpayer identification number; conduct of joint audits; or at least systematic

<sup>8</sup> As a copious literature on fiscal rules (see, *e.g.*, Kumar and Ter-Minassian, 2007; and IMF, 2009) makes clear, the calculation of structural balances is fraught with significant difficulties concerning the estimation of output gaps and elasticities of various budget aggregates to changes in such gaps, as well as to other factors, such as developments in commodities and asset prices. These difficulties are magnified for SNGs by the frequent lack of reliable estimates of potential output at the regional or local level.

exchange of relevant information) to improve monitoring and enforcement of compliance with shared and sub-national taxes during recessions;

- reduction of earmarking and other rigidities hindering an appropriate prioritization of any unavoidable spending cuts by SNGs during downturns;
- the arrangement, on the part of SNGs with market access, of contingent credit lines to be activated during downturns to finance the increased deficits; alternatively, overfunding during boom periods, with the excess balances placed in rainy day funds to be drawn down during recessions. Of course, the financial cost of such strategies should be carefully analyzed and weighed against their benefits in terms of reduction of pro-cyclicality.

Many of these reforms could also contribute to the medium-term fiscal consolidation efforts that will be needed in many advanced and developing countries around the world in the years ahead.

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### **COMMENTS ON SESSION 3 FISCAL POLICY AND FISCAL RULES**

*David Heald\**

I have three quite diverse papers to discuss:

- 1) “The Great Crisis and Fiscal Institutions in Eastern and Central Europe and Central Asia” by Luca Barbone and Luis Álvaro Sanchez Baracaldo of The World Bank,
- 2) “Fiscal Multipliers in the Euro Area” by Esther Gordo and colleagues at the Bank of Spain and the European Central Bank,
- 3) “Fiscal Policy in Colombia and a Prospective Analysis After the 2008 Financial Crisis” by Ignacio Lozano of the Central Bank of Colombia.

These comments relate to the versions presented at the Perugia workshop, not to subsequent revisions.

Although their coverage and methodologies are different, there is a common theme – whether fiscal policy works. That sub-divides into two questions: (a) whether fiscal policy only works in extreme circumstances; and (b) whether there has been a rethinking of the consensus that the main weight should be on monetary policy, with fiscal policy set for the long or at least the medium term. That is not just a technical question for policymakers and economists, as governments have issues about this with their electorates. If not just in extreme circumstances, why has what seemed an established consensus suddenly collapsed with the global financial crisis?

Turning to Barbone and Baracaldo, my comments relate to the Powerpoint slides in the absence of a formal paper. It is striking that there are many things happening in overlapping time periods. First, there is the collapse of Communism and the transition to market economies, very variable experiences across the countries that are considered. Second, for some countries, there is preparation for membership of the European Union (EU), and for other countries it is actual membership of the EU. Thirdly there were big shocks in 1998 and again in 2008. The latter seems to have led to a rethink about the role of fiscal policy in a way that I do not believe happened equivalently after 1998.

Therefore, I want to pose a set of questions and then make a number of suggestions. These questions resonate across the workshop as a whole. The first question is the extent to which the evolution of events has changed views on the role of fiscal policy, and, if so, does that apply to “normal times” or solely to “abnormal times”? Moreover, one of the Powerpoint slides shows that GDP growth rates, and the changes in them from year to year, are exceptionally large in these countries.

The second question is to what extent a country can or indeed should prepare for unlikely but extreme events. Obviously if every country tries to run balance of payments surpluses and fiscal surpluses, that in aggregate has significant implications for world trade and the global economy.

The third question is how to distinguish false dawns from genuine transformations whereby one suddenly manages to run the economy at a macro level and a micro level much more efficiently and hence government finances are in a much better state. How does one distinguish between false dawns and real structural changes in economies?

Fourth is the question of how to respond to the big increases in government debt associated with the global financial crisis. These countries face quite different absolute levels of debt and, if

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they have access to capital markets, some countries would seem to have the ability to accept an increase in debt whereas other countries would not.

The fifth question relates to conservative oil price assumptions. I am not sure quite when “prudent” becomes “conservative”, meaning that the government is deliberately understating potential oil revenues. If the government is doing that, over time that will become obvious with a resulting loss of trust in government forecasts. This runs completely contrary to more general arguments in favour of transparency.

I will now move on to specific comments on the Powerpoint slides, which might be useful when Luca and Luis proceed from the slides to writing a formal paper. First, a difficulty with the slides is that there is a lot of moving backwards and forwards between different groups of countries and individual countries, particularly Russia; I found that difficult to follow at times.

Second, the formal paper needs to go back to the three questions<sup>1</sup> asked at the beginning of the presentation and either say they can answer those questions or they cannot.

My third suggestion is in the context of access to finance for infrastructure, where Public-Private Partnerships (PPP) are mentioned. That is one of the themes of my own research (Heald and Georgiou, 2010). I would very strongly urge countries to concentrate on the possible value-for-money benefits of PPPs and to resist using them as a way around fiscal rules.

Fourth is the question about putting fiscal institutions in place. It came up in Richard Hughes’ discussion of G20 (Hughes and Ljungman, 2010) but applies here probably even more. One has to be very careful about the distinction between what formal institutions are in place and how those institutions work in practice. One needs a large amount of country knowledge to be confident about the latter.

Moving on to the Gordo *et al.* paper, I would like to congratulate Esther and her colleagues at the Bank of Spain for an exceptionally informative paper which is helpful in allowing the reader to follow complex arguments. It is fairly standard in the way that it adopts a Structural Vector Autoregression (VAR) approach. One of the positive features of the paper is that it clearly relates what it does to other research, thereby positioning itself within the emerging literature of the 2000s, within which it emphasises Blanchard and Perotti (2002). Where necessary, the paper holds the reader by the hand and takes them through the comparisons and contrasts very clearly. This is a background research paper, not explicitly about policy at the moment and not about policy in terms of the response to the global financial crisis.

I have some issues that the authors should consider. Firstly, I was struck by the period covered which runs from the first quarter of 1981 to the fourth quarter of 2007, hence my comment that it does not cover the global financial crisis. I would need to be convinced that the United States, which has been a single country over that period, is actually comparable to the Eurozone where fiscal policy was run entirely independently in those countries for the first twenty years and has been run within the context of the EU Stability and Growth Pact and membership of the single currency for the subsequent period. One of the reasons why I think that is important is that the paper gets very plausible econometric results which tie up very neatly to the US findings. At one level this is very attractive but I think the paper needs to offer greater justification of why that comparison is believed to hold, given the entirely different constitutional and fiscal circumstances that exist in the US and the Eurozone.

<sup>1</sup> Those three questions are: (1) How the fiscal institutional reforms introduced over the last decade help manage the crisis and mitigate its impact; (2) How did fiscal policy prior to the crisis affect the readiness of the countries to deal with the crisis; and (3) What are the lessons and what fiscal priorities are emerging after the crisis?

My second point relates to the issue of data measurement. This might be covered in Paredes *et al.* (2009), Paredes being one of the joint authors of the Gordo paper. The issue is about generating quarterly fiscal data. I am an accountant by academic background and the reference to “mostly on a cash basis” is a reminder that one has to think carefully about the cash-accruals distinction. I did not understand the very brief reference to methodology where it talked about a mixed-frequencies state space model; this is outside my expertise.<sup>2</sup> I have been very heavily involved in the UK’s move from cash accounting to accruals accounting in government. When the UK moved in 2001-02 from cash to accruals one thing that emerged was that there were problems with the previous cash figures.

My third point is about periodisation. The Gordo *et al.* paper discusses the fact that the results for the US differ from those of Perotti (2004) when the sample length is taken as a whole, but for 1981 to 2000 the results are actually very similar. They make the point that the output multipliers are higher for both the US and EMU from 2000 onwards and I think it needs more discussion about why that might be so during that period. There was a suggestion that it might possibly be due to the global savings glut or to a decrease in global risk. Given what we now know about what happened in 2008 I find it difficult to believe that there was actually a decrease in global risk in the period 2000 to 2007. They also include dummy variables but the dummy variables for the period are not significant. This is an issue that I think needs further discussion.

Fourth, there is a reference in the paper to the decision whether or not a country entered EMU being taken on the basis of the fiscal deficit recorded in 1997. There is evidence of data manipulation, on which I would cite James Savage of the University of Virginia on the discussions between Eurostat and Greece in the run up to membership of the Eurozone (Savage, 2006). There is an issue about the data and what incentives there might have been to manipulate. In addition, this is another place where PPPs are mentioned and this raises the whole question of off-balance sheet transactions. The way in which these might affect the data used in the study is something that could usefully be discussed.

Ignacio Lozano’s paper is quite different from the first two because it is a case study of Colombia. The key results are that fiscal policy by central government in Colombia has been procyclical in the period 1960 to 2008. I would have been interested to know what would have happened if the measure was for general government but I do not know how important sub-national government is in the context of Colombia. Another interesting finding is that fiscal volatility was highest in the 1990s during the period of highest growth. Colombia generally seems to be coping well with the global financial crisis. If the increase in public debt is only 10 per cent as a result of the crisis and that is for the consolidated public sector, then many other countries would be pleased with that outcome.

When the paper is revised for publication there needs to be more discussion about how much confidence one can have in output gap calculations. Again, I do not know about Colombia but output gap calculations for the UK suggest that one should be somewhat careful; obviously, the cyclically adjusted figures depend on what you think the output gap is.

Secondly, Lozano (p. 488) notes that “The adoption of fiscal rules has become an institutional strategy for most OECD countries and for several [Latin American countries]”. I can see why Colombia is attracted to fiscal rules. The circumstances whereby it lost its investment grade rating in the 1990s are not explained but, given that other countries around it have investment grade rating, I can see the attractions of trying to re-acquire it. I can see that fiscal rules have some potential significance but when you can get hit by fiscal shocks, whose severity nobody could have

<sup>2</sup> In the words of Gordo: “In the case of the euro area ..., fiscal data have been taken from a newly available quarterly fiscal data set compiled by Paredes *et al.* (2009). They employ intra-annual fiscal data, mostly on a cash basis, in a mixed-frequencies state space model to obtain quarterly fiscal data for the aforementioned period [1981 Q1 to 2007-08 Q4]” (p. 521).

anticipated, I would take the view that fiscal rules need to be supplemented by very clear escape clauses and also by a requirement on governments to be transparent and give explanations.

Finally, returning to the data manipulation problem, we know that if governments are tied in by what they perceive as arbitrary rules unconnected with present circumstances, they will find ways to circumvent them. While understanding why Colombia would be attracted to fiscal rules in terms of its international profile, I would reinforce the general point that transparency about what is happening is just as important as fiscal rules.



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### COMMENTS ON SESSION 3 FISCAL POLICY AND FISCAL RULES

*Christian Kastrop\**

#### **Some remarks on the papers by Barrios, Langedijk and Pench and by Creel and Saraceno**

I would like to discuss both papers not on technical terms but taking them as an important part of an ongoing debate about the outgoing (?) crises.

Not only the present but also the future role of fiscal policy is at stake. The role of fiscal policy is a crucial part of the exit strategies, but it is also very important to strengthen our future crises mitigation and adaption system.

Both papers reflect quite important questions on fiscal policy, e.g., on the possible interplay of nominal/real exchange rate depreciation/devaluation with consolidation results and on the role of discretionary fiscal policy concerning (also potential) output.

The main finding of Creel and Saraceno is that empirical evidence shows that discretionary policy could and should still play an important role, and that it could still be a necessary complement, as automatic stabilizers might be ineffective. The Ricardian view conditions are not met, there are no full rational expectations.

Generally speaking, this could lead to a more critical view of rule-based fiscal policy as the underlying paradigm of the SGP. A follow-up question, however, would be if the partly/temporary missing rational conditions could really be crucial for a rule-based policy or whether we have to look at other variables too to judge a concrete case.

The main finding of Barrios *et al.* is that, analyzing consolidation episodes, the best chance of a successful consolidation is given rescuing the banks first, and then implementing a vigorous consolidation policy (“cold showers”). If the initial debt level is high, this approach should be tough and sustained, while in countries better off, *i.e.* with some “fiscal space”, a more gradual approach seems preferable.

This result supports the main core of arguments concerning high-debt countries. The general reasoning here might be that better-off countries (Germany *et al.*) might be too tough now. Again, the question might be whether there are other elements to take into consideration. If, in the single currency zone, one anchor country loses credibility – even if this happens only within the country – there could be negative spill-overs in the whole Eurozone. And this might happen even if that country’s electorate is oversensitive to debt, compared to other countries.

Barrios *et al.* also conclude that nominal or real exchange rate variations, enacted in order to affect export-led growth, do not facilitate consolidation efforts, even if databases show that for certain cases this statement looks like a generalization. It probably should be checked against different packages of structural reforms, e.g., macro wage packages/social security packages and micro measures enhancing competitiveness and their respective fiscal costs.

It seems somewhat odd that a well-designed export-led growth strategy would not eventually give some positive impact on (potential) growth.

Having said this, let me offer some German views, which of course are entirely personal and do not reflect the view of the Ministry. It is very valuable and timely to discuss such questions.

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Indeed, the institutional architecture and the design of “real” policies might be more crucial now, as globalization will not vanish – quite the opposite, in fact. Therefore, cross-fertilization via financial, fiscal and macro/micro channels will be the forced rule in the 21<sup>st</sup> century economies.

We still see a rule-based policy in line with a (reformed) SGP as the foundation of the house of fiscal policy. It is an indispensable mainstay for a stable and successful monetary union. In the short run, this means a sensible consolidation as part of a credible exit strategy. At the very least, the German view is that, in addition to the argument that fiscal space in this context does not come too late, there is also the risk that a belated withdrawal of macro/fiscal support (tax cuts, expenditure increase) could be pro-cyclical, hamper credibility and create higher deficits – especially when the population gets used to some of the measures implemented.

Let’s take Germany as an example: the large scale enlargement of short-term labour support really played a part in the German success in crises response. Trade unions soon come to look very favourably on an instrument that nevertheless bore high public and private costs. However, making use of this enlargement as a regular recourse would worsen considerably both labour costs and public budgets.

However strong Ricardian effects might be in specific times/cases, in the medium and long run a balanced budget approach makes sense, together with a focus on potential growth. This especially holds for highly developed ageing societies that do not have natural resources, anticipating their respective foreseeable and unavoidable fiscal challenges.

Therefore, in the long run, we clearly see a Ricardian approach in fiscal policy focussing on sustainability and quality of public finance. And, of course, this is the core philosophy behind the German paradigm change concerning the deficit rule in the constitution, which will be very close to the MTO of the SGP.

The last point I would like to make concerns the question whether this is sufficient to tackle the crises.

First, of course, I would not wish to argue that the German view applies necessarily to other countries, as all specific conditions – in the economy, in policy and in society – differ, and this variety of situations is acceptable and even favourable for a federal EU architecture. Each country should make up its own mind – aware, however, of the possibility of spillovers. There should perhaps be some outer limits of policy responses for the eurozone countries, but this is beyond the scope of these comments.

However, I strongly believe that the German response is not only good for Germany but also a big safeguard for the credibility of the eurozone as a whole – positive even for those countries in trouble with sovereign debt. But, of course, Germany has to deliver more, also on macro/structural terms, on opening markets, education and health and it is clear it has to strengthen the internal demand – with one condition: not at the expense of competitiveness, fiscal solidity and credibility.

Second, there is something missing. We have to build additional credible and market-oriented support/debt restructuring mechanisms for sovereign liquidity and, most of all, for solvency problems – complementary to the SGP. This has to be worked out within this year or we will all be in serious trouble.

## COMMENTS ON SESSION 3 FISCAL POLICY AND FISCAL RULES

*Jana Kremer\**

### 1 Introductory remarks

Fiscal policy needs rules. This is because policy makers (and their voters and advisers) tend to accept high deficits and debt “in the short term” in the pursuit of various worthy goals, while leaving the task of achieving sustainable public finances for the future. Excessively high debt is the consequence, which eventually limits the room to manoeuvre in terms of fiscal policy. As the financial market crisis and the rapid swings in confidence in public finances in some countries have shown, there is a need for both effective rules for ordinary times and appropriate exemption clauses for exceptional circumstances. A key challenge when designing an exemption clause is to provide some flexibility while at the same time preventing the exemption from becoming the rule and ultimately subverting the objective of the original rule. The discussion about fiscal stabilisation measures in the context of the crisis and about how to exit from them underscores the difficulty in this regard as it shows that there is no consensus about the exact nature of an “extraordinary event” (as distinct, for example, from an unpleasant event) and the appropriate policy response.

An important aim of fiscal rules for ordinary times is to support a sustainable fiscal policy by curbing the deficit bias. As a side product, this helps to ensure that public finances are in good shape when an emergency arises. A major difficulty for fiscal rules in crisis as well as ordinary times is the significant uncertainty when forecasting public finances and the difficulty defining (conceptually and in practice) appropriate indicators and quantitative thresholds to mechanically assess the state of public finances. Here, an independent fiscal agency or another monitoring arrangement that provides policy makers and the public with information on public finance developments and prospects, and evaluates specific fiscal policy measures can play an important role. However, since there is often no consensus about the state of public finances and the best policy measures, responsibility ultimately lies with elected parliaments and governments (or sometimes, where the issue is compliance with legislation, with the courts). At the same time, the large degree of uncertainty suggests the advisability of prudent fiscal planning and an adequate adjustment mechanism, which implies a smooth (preferably non-cyclical or anti-cyclical) and efficient correction after unintended deviations from fiscal plans. Another issue is enforcement in case of intentional rule-breaking. Besides political economy aspects, enforcement is complicated since plausible reasons will often be put forward to justify a violation of the rule. If the rule includes smooth adjustment mechanisms for cases of truly unexpected developments, enforcement can be more rigorous, however.

The two interesting contributions “Fiscal Institutions in New Zealand and the Question of a Spending Cap” by Tracy Mears, Gary Blick, Tim Hampton and John Janssen, and “Impact of the Global Crisis on Sub-national Governments’ Finances” by Teresa Ter-Minassian and Annalisa Fedelino highlight important aspects relating to fiscal institutions, fiscal rules and fiscal stabilisation policy. The discussion in the following sections partly draws on the observations outlined above.

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The views expressed here are those of the author and do not necessarily reflect those of the Deutsche Bundesbank.

## 2 Comments on “Fiscal Institutions in New Zealand and the Question of a Spending Cap” by Tracy Mears, Gary Blick, Tim Hampton and John Janssen

The paper starts by describing fiscal developments and the performance of the fiscal policy framework in New Zealand over the past decade. Generally, the authors attest a good performance regarding net debt. This raises the question of how the institutions would have performed in bad times and how reliable net debt, which is difficult to measure, is as an indicator. As a crucial problem within the current fiscal framework the authors identify that it did not prevent the strong rise in government spending in relation to GDP after 2004-05. Even though the expenditure ratio is still relatively low by international standards, the increase is problematic if it is related to the spending of temporary revenue windfalls and reflects a suboptimal rise in spending in good times. To the extent that spending was too high because of a lack of timely information on the true state of the economy and public finances – which is probably the case at the current junction, but may not have been the problem in the first years after 2004 – one would not necessarily speak of a failure of institutions, but rather rethink the quality of budgetary forecasts and the set of fiscal indicators employed. However, taking into account the known forecast uncertainties and considerable forecast errors, which complicate public finance analysis,<sup>1</sup> it also seems warranted to consider additional thresholds or limits that can support a sustainable fiscal policy with a medium-term orientation.<sup>2</sup>

Against this backdrop, the authors propose a spending cap as an additional element of fiscal institutions in New Zealand. Several general caveats apply to spending rules. For example, the delineation is often unclear, in particular in terms of tax expenditures, outsourcing activities or price effects. Furthermore, an increasing expenditure ratio might not be due to a spending bias and therefore be suboptimal. Instead it might be the consequence of evolving preferences over time (e.g., increasing preference for social security). Keeping these caveats in mind, the proposed spending cap can help to prevent unexpectedly high revenue from being spent immediately (as would be possible within the confines of the current deficit rule). It has to be noted, however, that the proposed cap is relatively complex. *Inter alia*, several budgetary items are excluded from the cap, which might aggravate the problem of delineation. With regard to unemployment expenditure, it seems to be more straightforward to adjust this item for cyclical factors than to exclude also its structural development from the cap. Generally, one might consider defining the cap in terms of cyclically-adjusted expenditure and to take (expected) developments of trend nominal GDP – as a reference line for a neutral expenditure path – into account.

As an alternative to the spending cap that would avoid some of the problems with spending rules outlined above and address more directly the problem that unsustainable revenue windfalls might be spent under a deficit rule, one might consider capping fiscal loosening after unexpectedly favourable developments in terms of cyclically adjusted tax revenue. This forms part of the proposals by Kremer and Stegarescu (2009).<sup>3</sup> It – as similarly in Mears *et al.* – also addresses the problem that overly strict rules might be procyclical in case of negative revenue surprises (which often coincide with bad times). To this end, it is proposed to combine a target for the cyclically adjusted deficit ratio with a symmetric and gradual adjustment mechanism to return to the target after an unexpected revision of the forecast for cyclically adjusted tax revenue. Furthermore, the

<sup>1</sup> See, e.g., Morris *et al.* (2009), “Explaining Government Revenue Windfalls and Shortfalls: An Analysis for Selected EU Countries”, ECB, Working Paper, No. 1114, regarding the problem of measuring the “underlying fiscal position”.

<sup>2</sup> In addition, it might be worthwhile further investigating the role of the distinction between formula-driven indexed items and others in the current framework. Ex ante indexation might be particularly problematic in times of negative growth surprises. Furthermore, with stricter rules – as for example with an additional spending cap – the issues of transparency, bypassing and enforcement of rules might become more relevant.

<sup>3</sup> Kremer, J. and D. Stegarescu (2009), “Neue Schuldenregeln: Sicherheitsabstand für eine stetige Finanzpolitik”, Wirtschaftsdienst 09/2009, pp. 630-36 (English version available).

need for and adequate size of safety margins – which is also an issue in the proposal of Mears *et al.* – are discussed.

### **3 Comments on “Impact of the Global Crisis on Sub-national Governments’ Finances” by Teresa Ter-Minassian and Annalisa Fedelino**

Against the backdrop of the recent experiences, Ter-Minassian and Fedelino address problems that arise if cyclical conditions and economic shocks differ between regions and if fiscal policy is not adequately coordinated between different government levels. In this case, the policy pursued in one region or government level may offset the (discretionary or automatic) fiscal impulse of another region or level. Furthermore, spillover effects or the specific assignment of competences mean discretionary fiscal stimulus may be more effective if coordinated between regions and levels. In addition, achieving sustainable public finances is a common task for all government levels. Generally, these observations demonstrate that the design of fiscal rules at all government levels should be consistent with the overall fiscal policy aims and highlight, in particular, the importance of sub-national fiscal rules – where details naturally depend on country-specific federal structures.

In this context, the distinction between the rules for ordinary times (e.g., ordinary economic cycles) and exemptions for extraordinary events (e.g., current crisis) appears highly relevant. Generally, the recent experiences in times of crisis do not seem to suggest a fundamental review of discretionary stabilisation policy and fiscal federalism issues in ordinary times. Given the familiar problems of regular economic fine-tuning, a discretionary stabilisation policy during ordinary economic cycles does not appear advisable – be it coordinated or uncoordinated between different government levels and regions. In terms of major obstacles, namely the lack of suitable methods to assess economic conditions in real time (where scepticism has grown rather recently) and the asymmetry of fiscal policy interventions owing to the political debt bias, the fine-tuning of fiscal policy to specific regional developments is most likely even more error-prone than stabilisation policy at the national level.

On the other hand, reforms that allow a smoother working of automatic stabilisers in federal states, for example a better alignment of the fiscal rules at specific government levels and improvements to the degree of volatility of the respective budgets, could be addressed more seriously. In this context, shifting cyclical budgetary fluctuations to higher (central or state) government levels by providing regional levels – in accordance with mainly exogenous expenditures and balanced budget rules – with stable revenue (via transfers from higher to regional level) and a moderate fiscal equalisation system among regions to dampen asymmetric regional shocks on public finances seems relevant. In addition, the crisis underscored the need to design exemption clauses for “extraordinary events” more carefully. An important task here is to prevent over-fulfilment in the sense that overly broad exemption clauses might undermine fiscal policy aims in ordinary times. With a view to federal structures, some shortcomings in dealing with extraordinary events were revealed during the recent crisis. In particular, for the timely and efficient implementation of discretionary stabilisation measures in the case of an extraordinary, self-reinforcing economic downturn (e.g., speedy increases in government investment by regions that might face binding budget constraints), the demands placed on a fiscal federation in terms of coordination and monitoring might be higher than in ordinary times.





#### **Session 4**

#### **THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY**



# THE CONSEQUENCES OF BANKING CRISES FOR PUBLIC DEBT

*Davide Furceri\* and Aleksandra Zdzenicka\*\**

*The aim of this paper is to assess the consequences of banking crises for public debt. Using an unbalanced panel of 154 countries from 1980 to 2006, the paper shows that banking crises are associated with a significant and long-lasting increase in government debt. The effect is a function of the severity of the crisis. In particular, we find that for severe crises, comparable to the most recent one in terms of output losses, banking crises are followed by a medium-term increase of about 37 percentage points in the government gross debt-to-GDP ratio. We also find that the debt ratio increased more in countries with a worse initial fiscal position (in terms of the gross debt-to-GDP ratio) and with a higher share of foreign debt.*

## 1 Introduction

Financial crises are not only typically associated with sharp economic downturns,<sup>1</sup> but also with a substantial deterioration of fiscal positions. Declining revenues due to weaker economic conditions, higher expenditures associated with bailout costs and demand stimuli have historically led to a rapid deterioration of fiscal balances and increase of public debt.<sup>2</sup>

Analysing a panel of developed and developing economies, Reinhart and Rogoff (2009) estimate that in the 3 years after the occurrence of a banking crisis the real value of government debt rose on average by 86 per cent. However, arguably measuring the change in debt this way can be misleading because it depends on the initial level of the debt. Alternatively, if the rise in debt is measured in terms of the change in the ratio of debt to GDP, the figures becomes considerably smaller; using similar episodes to those chosen by Reinhart and Rogoff (2009), but focusing on the percentage point increase of the debt-to-GDP ratio, the historical average cumulative increase in the debt-GDP ratio 3 years after the occurrence of banking crises is about 9 percentage points of GDP (Figure 1). The effect varies considerably across the episodes presented in the figure, ranging from an almost insignificant increase in the case of Thailand in 1997 to an increase of more than 35 percentage points for Finland in 1991. In addition, countries differ not only in terms of the magnitude of the impact in the 3 years following the crisis, but also in terms of the dynamic of the response and in terms of medium-term effects. For example, three years after financial crises in Japan and Finland the effect on debt is very similar, however the medium-term evolution beyond three years is very different (Figure 2).

The current financial crisis is exceptional not only for its severity and its synchronicity across countries, but also for the policy response: monetary policy rates have been slashed, central

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The views expressed in this paper are those of the authors and do not necessarily represent those of the OECD or its member countries.

<sup>1</sup> See, for example, Aziz *et al.* (2000); Barro (2001); Hutchinson and Ilan (2005); Boyd *et al.* (2005); Cerra and Saxena (2008); Furceri and Mourougane (2009a, b); and Furceri and Zdzenicka (2010a, b).

<sup>2</sup> See, for example, Caprio and Klingebiel (1997); Honohan and Klingebiel (2000); Laeven and Valencia (2008a); Reinhart and Rogoff (2008); Furceri and Mourougane (2009a); and OECD (2009).

bank balance sheets expanded, and most governments have taken expansive fiscal measures to counter the economic downturn. For many countries debt levels are projected to increase substantially. For example, in OECD countries (Figure 3) gross government debt-to-GDP ratios are projected to increase by more than 20 percentage points by 2011, and in some cases (Iceland, Ireland, Japan, and the United Kingdom) by more than 30 percentage points (OECD, 2010). Focusing on a longer time horizon (Figure 4), debt levels may increase even more (OECD, 2010). Based on the assumption that government consolidation measures are only gradual but sufficient to stabilise debt-to-GDP ratios over the long term, debt-GDP ratios may still increase by about 30 percentage points by 2025 compared to pre-crisis level, with the largest increase being projected for Ireland (about 100 percentage points) and the United Kingdom (about 80 percentage points).<sup>3</sup>

In the context of the aftermath of the recent financial crisis this paper considers past historical episodes to

Figure 1

**Cumulative Increase in the Debt-to-GDP Ratio  
in the Three Years Following the Banking Crises  
(percent of GDP)**

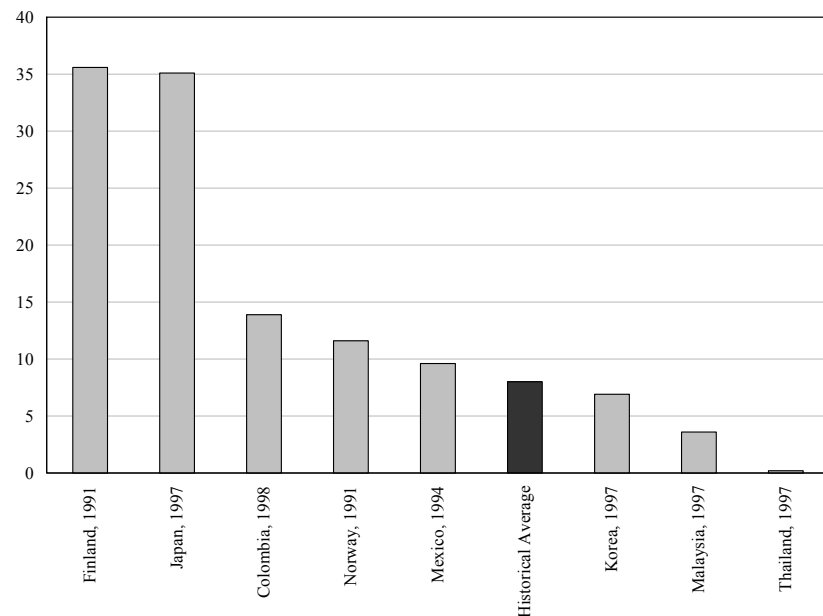
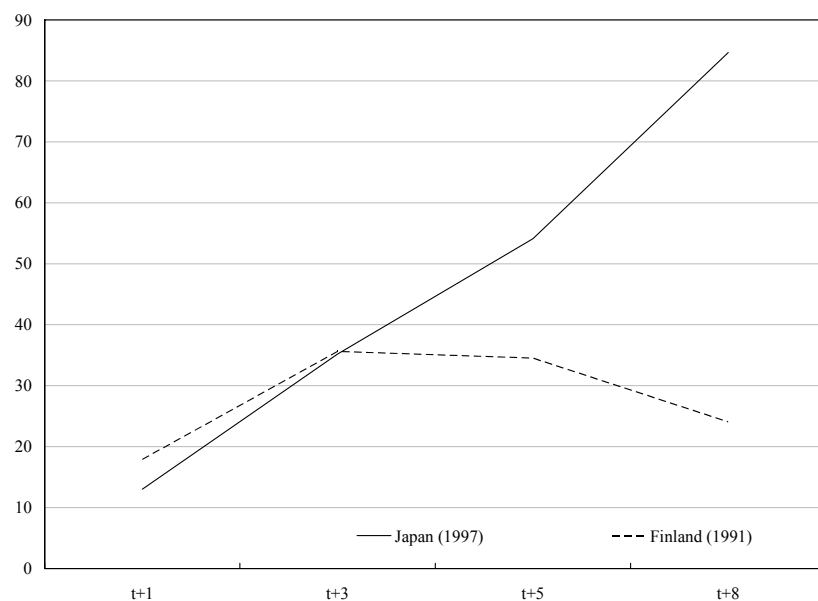


Figure 2

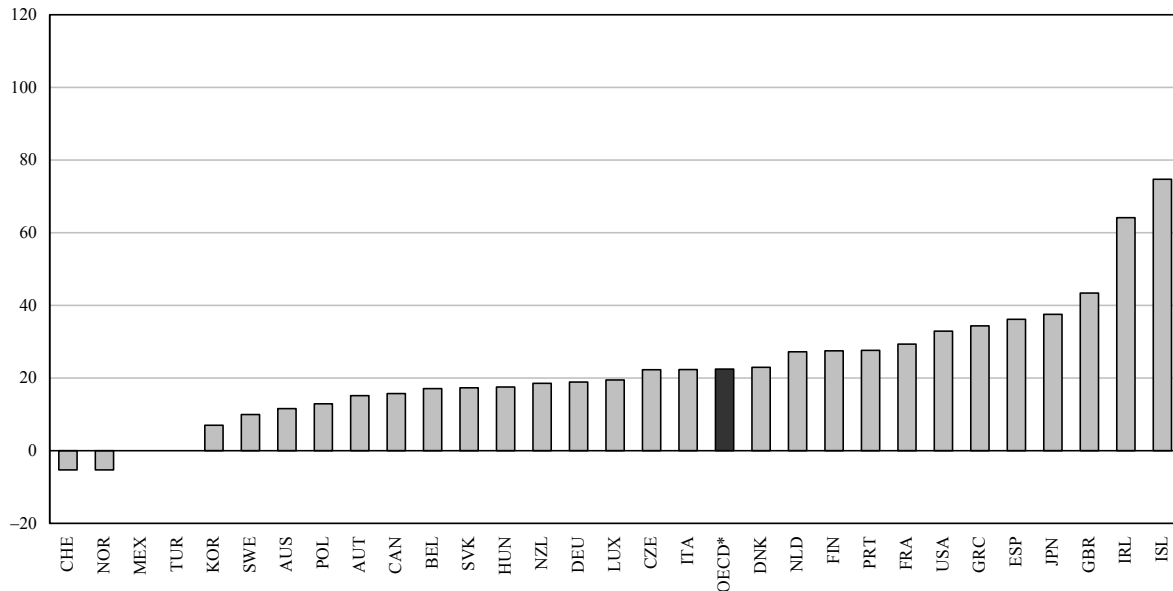
**Evolution of the Debt-to-GDP Ratio  
Following Banking Crises in Finland and Japan  
(percent of GDP)**



<sup>3</sup> In particular, it is assumed that the underlying primary fiscal balance improves by  $\frac{1}{2}$  per cent of GDP until it is sufficient to ensure that the debt-to-GDP ratio is stable. See, Chapter 4 of OECD's *Economic Outlook 87* (2010) for more details.

Figure 3

**Projected Increase in the Government Debt-to-GDP ratio, 2007-11**  
(percent of GDP)

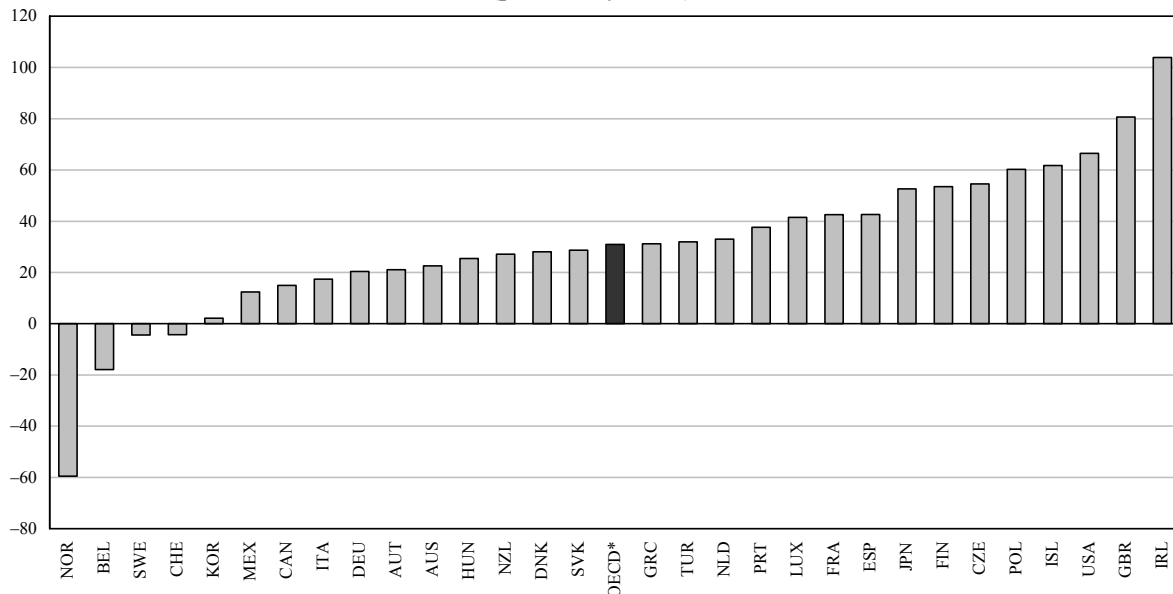


Source: OECD (2010), *Economic Outlook 87 Database*.

Note: \* unweighted average of OECD countries excluding Mexico and Turkey.

Figure 4

**Projected Increase in the Government Debt-to-GDP Ratio, 2008-25**  
(percent of GDP)



Source: OECD (2010), *Economic Outlook 87 Database*.

Note: \* unweighted average of OECD countries excluding Mexico and Turkey. Projections are based on the assumption that government debt-to-GDP will stabilize by 2025 as a result of gradual consolidation measures. See the OECD's *Economic Outlook 87* (2010) for more details.

examine what has happened to public debt over the medium and long term. The paper provides estimates of the dynamic impact that banking crises episodes have typically had on the gross debt-to-GDP ratio, and of the role that structural and policy variables have had in shaping this response. The analysis complements previous work analysing the fiscal costs associated with banking crises in several respects by:

- focusing on gross public debt as a dependent variable. Several papers in the literature have instead focused on trying to estimate only the bailout costs associated with banking crises.<sup>4</sup> However, there are two main problems with this approach. First, estimates of fiscal bailouts depend markedly on the methodology used. As a result, the difference in the estimates across studies focusing on the same episodes is large (Frydl, 1999 and Vale, 2006). Second, bailout costs are only a part of the fiscal cost associated with banking crises. In fact, the fiscal consequences of banking crises also result from the reduced revenues associated with output losses, the increase in spending due to automatic stabilisers and from discretionary increases in the public deficit;
- the focus is on the debt-to-GDP ratio rather than the percentage change in debt levels. This is important for two reasons. First, the debt-to-GDP ratio is a better measure to assess fiscal sustainability. Second, analysing the percentage increase of debt levels in the aftermath of banking crises could lead to possible mis-interpretations since the percentage increase crucially depends on the initial level of the debt before the occurrence of the crisis. For example, consider two crises episodes: Sweden (1991) and Colombia (1998). Following Reinhart and Rogoff (2009), the increase in the gross public debt in the three years following the banking crisis as in Colombia implies that public debt increased by about 175 per cent, while in Sweden it increased by about 60 per cent. However, when the percentage point increase in the debt-to-GDP ratio is considered, as in Figure 1, the result leads to a spectacular reversal of this ranking: fiscal positions deteriorated significantly more in Sweden (27 percentage points of GDP) than in Colombia (13 percentage points of GDP);
- presenting inferential empirical evidence on the increase of the debt-to-GDP ratio in the aftermath of banking crises. The only work, to our knowledge, that tries to assess the increase in public debt (not as ratio to GDP, as discussed previously) is Reinhart and Rogoff (2009). However, in their paper, the authors present only descriptive evidence of the increase in the gross government debt 3 years after the occurrence of banking crises, without controlling for countries characteristics and other factors that could explain the increase in public debt in the short term and different responses across countries;
- estimating the effect of banking crises on the debt-to-GDP ratio both in the short and in the long-run,<sup>5</sup> in particular to assess whether fiscal costs associated with the crises have been permanent or if they have tended to dissipate in the long term;
- analysing the heterogeneity of responses among different countries and episodes.

Using an unbalanced panel of 154 countries from 1970 to 2006, the main findings of the paper is to show that banking crises are associated with a significant and long-lasting increase in the government debt-to-GDP ratio. The magnitude of effect is a function of the severity of the crisis. In particular, we find that for severe crises, comparable to the most recent one in terms of output loss, banking crises are on average followed by a medium-term increase of about 37 percentage points in the government gross debt-to-GDP ratio. We also find that larger increases in debt tended to occur in those countries with the worse initial fiscal positions (in terms of gross debt-to-GDP ratio) and with the highest share of foreign public debt.

<sup>4</sup> See, among others, Caprio *et al.* (2005) and Sanhueza (2001).

<sup>5</sup> Previous works generally focus on a time horizon of 3 years.

The rest of the paper is organised as follows: the next section describes the data and the empirical methodology used to examine the effects of a financial crisis on debt; Section 3 describes the results; and finally, Section 4 concludes with the main findings.

## 2 Data and empirical methodology

### 2.1 Data

Data for real gross debt-to-GDP ratio are taken from the IMF's *World Economic Outlook* (2009). Data for the share of gross foreign public debt over total public debt are taken from Panizza (2008), where public foreign debt is defined as issued in foreign countries and under the jurisdiction of a foreign court. Data for banking crises episodes are taken from Laeven and Valencia (2008a). In the latter paper the authors provide detailed information on the starting date of several banking, currency and debt crises. The dataset is constructed by combining quantitative indicators measuring banking sector distress, such as a sharp increase in non-performing loans and bank runs, with a subjective assessment of the situation. In particular, the database extends and builds on the database of Caprio *et al.* (2005) and covers the universe of systemic banking crises (124 episodes) for the period 1970-2007.<sup>6</sup>

### 2.2 Empirical methodology

In order to estimate the dynamic impact of banking crises episodes on the debt-to-GDP ratio the paper follows the approach proposed by Jorda (2005) and Teulings and Zubanov (2009) which consists of estimating impulse response functions (IRFs) directly from local projections. In detail, for each future period  $k$  the following equation has been estimated on annual data:

$$b_{i,t+k} - b_{i,t} = \alpha_i^k + \sum_{j=1}^l \gamma_j^k \Delta b_{i,t-j} + \beta_k D_{i,t} + \varepsilon_{i,t}^k \quad (1)$$

with  $k=1,..8$ . Where  $b$  indicates the government gross debt-to-GDP ratio,  $D$  is a dummy that takes the value equal to 1 in the occurrence of a banking crisis and zero otherwise,  $\alpha_i$  represent country fixed effects,  $\gamma_j$  captures the persistence in changes of the debt ratio, and  $\beta_k$  measures the impact of banking crises on the change of the debt ratio for each future period  $k$ . The number of lags ( $l$ ) has been tested, and the results suggest that inclusion of two lags produce the best specification.<sup>7</sup> Correction for heteroskedasticity, when appropriate, are applied using White robust standard errors, while the problem of autocorrelation in the errors is addressed using two lags of the explanatory variable as regressors.<sup>8</sup> Impulse response functions (IRFs) are then obtained by plotting the estimated coefficients  $\beta_k$  for  $k=1,..8$ .

An alternative way of estimating the dynamic impact of banking crises on output is to estimate an ARDL equation of debt-to-GDP ratio and crises dummies and to compute IRFs from the estimated coefficients.<sup>9</sup> However, the IRFs derived using this approach are sensitive to the choice of the number of lags, and the inclusion of interaction terms in the equation often leads to problems of multicollinearity, thus making the IRFs unstable. In addition, the significance of

<sup>6</sup> See Tables 1 and 2 for a detailed description of crises episodes.

<sup>7</sup> The results are extremely robust to the number of lags included in the specification.

<sup>8</sup> Tests for autocorrelation of the residuals have been carried out and have rejected the hypothesis of serial correlation.

<sup>9</sup> This approach was initially proposed by Romer and Romer (1989) and then recently applied by Cerra and Saxena (2008); Furceri and Mourougane (2009a, 2009b); and Furceri and Zdzienicka (2010b) to assess the impact of financial crises on economic activity.

long-lasting effects on the debt ratio with ARDL models can be simply driven by the use of one-type shock models (Cai and Den Haan, 2009).

In contrast, the approach used in this paper does not suffer from these problems because the lags of the change in the debt ratio enter only as control variables and are not used to derive the IRFs. Finally, the confidence bands associated with the estimated IRFs are easily computed using the standard deviations of the estimated coefficients  $\beta_k$ , and Monte Carlo simulations are not required.

### 3 Results

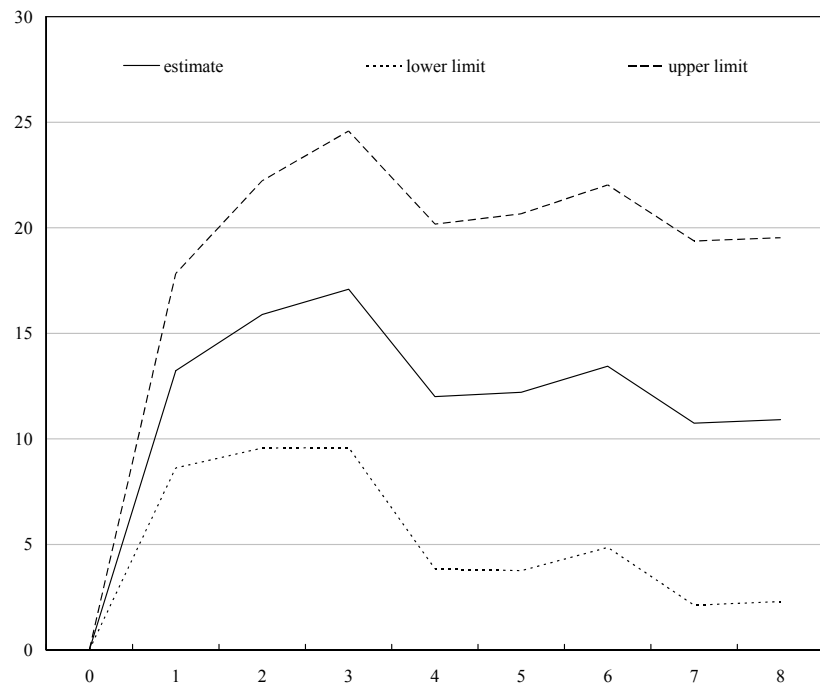
#### 3.1 Baseline

The impact of banking crises on the gross government debt-to-GDP ratio is estimated as described in equation (1). The results for each period  $k$  are displayed in Figure 5, together with the associated confidence bands.<sup>10</sup> Looking at the figure it is immediately apparent that banking crises are associated with a significant and long-lasting increase in public debt. In particular, banking crises have typically increased the government gross debt-to-GDP ratio by about 12 percentage points in the short term (1 year after the occurrence of the crisis), and by about 10 percentage points in the medium term (8 years after). In addition, we find that the largest increase in the debt ratio (17 percentage points) has typically occurred around 3 years following the occurrence of a banking crisis.

To check for the robustness of the results, equation (1) is re-estimated by alternatively including 1) time fixed effects, 2) a common time trend, 2) a country-specific time trend. Time fixed effects are included to control for specific time shocks, such as those affecting world interest rates. A time trend is used to control for common trends in the developments of debt-to-GDP ratios. Finally, a country-specific time trend is included to allow the trend in debt-to-GDP ratio to differ across countries. The results using these different controls remain statistically significant and broadly unchanged (Figure 6a-6c).

**Figure 5**

**The Effect of Banking Crises on the Debt-to-GDP Ratio**  
(percent of GDP)



The central scenario is surrounded by the intervals that reflect the uncertainty in the demography, the labour market, the benefit ratio and the business cycle.

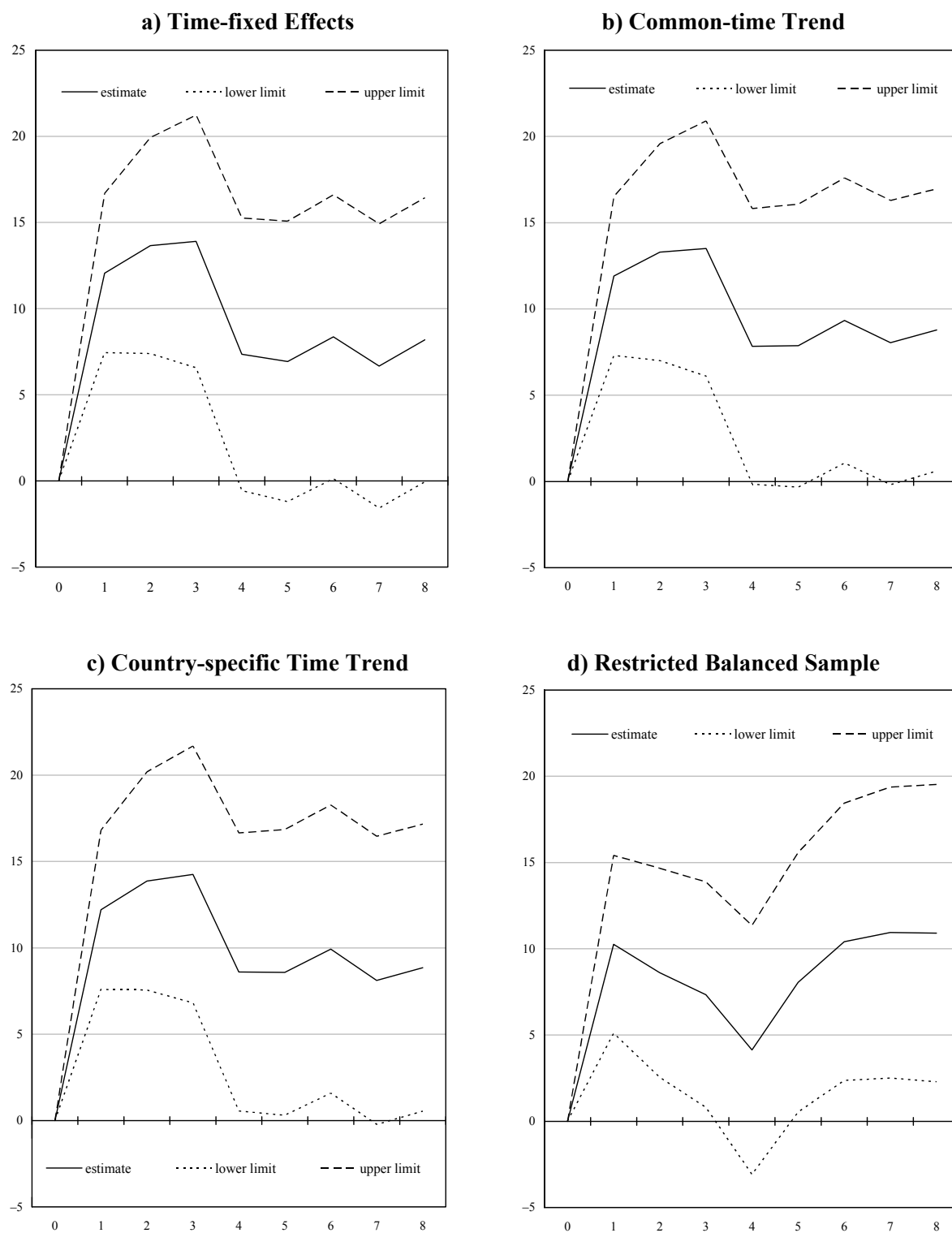
Source: INE, Ministerio de Trabajo y Asuntos Sociales and own elaboration.

<sup>10</sup> See Table 3 for more detailed information regarding the estimated parameters in equation (1).



Figure 6

### Robustness Tests (percent of GDP)



Note: dotted lines represent 90 per cent confidence bands.

As an additional robustness test the estimation sample is restricted to those countries for which data for  $b_{i,t+k}$  are available for each period  $k$ . The reason for doing so is to control for a possible composition bias deriving from estimating  $b_{i,t+k}$  over an unbalanced set of countries. The results for the restricted sample (displayed in Figure 6d) suggest that the short and the medium-term effects are almost identical to those estimated for the unbalanced baseline sample.

Finally, to also test whether the effect is similar between advanced and less developed economies, equation (1) is augmented by including a dummy for OECD countries as a control and as interaction term with the crisis dummy, as follows:

$$b_{i,t+k} - b_{i,t} = \alpha_i^k + \sum_{j=1}^l \gamma_j^k by_{i,t-j} + \beta_k D_{i,t} + \vartheta^k OECD_{i,t} + \delta^k OECD_{i,t} D_{i,t} + \varepsilon_{i,t}^k \quad (2)$$

The coefficient associated with the interaction term is statistically significant, suggesting that the effect of banking crises on public debt is not statistically different between the two groups of countries. The unconditional effect is still positive, statistically significant and of the same order of magnitude as the one estimated in the baseline specification (Table 3).

### 3.2 Severity of the crises

The results presented so far have shown that on *average* banking crises have had significant and persistent effects on the government debt-to-GDP ratio. However, it is reasonable to think that fiscal policy responses, both in terms of size of fiscal stimulus packages to counter the crisis and in terms of the increase in the deficit due to automatic stabilisers, may be a function of the output losses and therefore vary with the severity of the crisis. This would imply that the baseline estimates tend to over-estimate the impact on government debt for “moderate” banking crises and to under-estimate the impact for “severe” crises.

To test for this hypothesis equation (1) is for two groups of crises: i) severe crises, *i.e.* banking crises associated with cumulative output losses (computed as the deviation of the annual growth rate from the average trend) above 4 per cent, which are comparable to the current circumstances;<sup>11</sup> ii) moderate crises, *i.e.* banking crises associated with output losses below 4 per cent. The results of this exercise are reported in Figure 7. Looking at the figure it is possible to observe a different response of the debt-to-GDP ratio between moderate and severe crises, both in the short and in the medium term. In particular, for moderate crises (Panel A) the maximum effect is about 15 percentage points after 4 years and it becomes insignificant in the medium term (after 8 years). For severe crises (Panel B-C), the peak effect is about 50 percentage points (three times bigger than the average effect presented in the baseline scenario) and the medium-term effect (eight years after) is about 37 percentage points.

The results for severe crises are in line with the recent IMF’s *World Economic Outlook* (2010) and OECD’s *Economic Outlook* (2010) medium-term projections for the debt-to-GDP ratio.

### 3.3 Initial debt

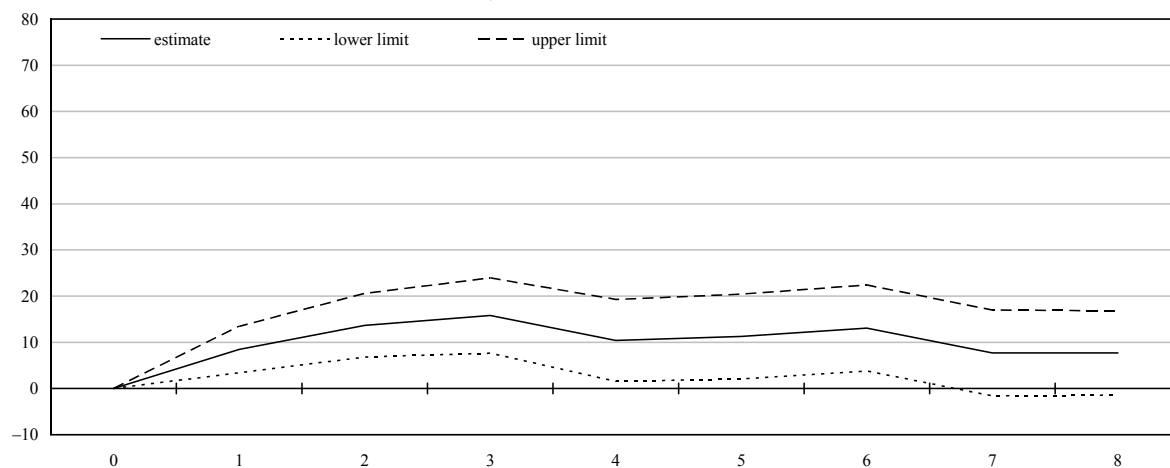
The rise in public debt in the aftermath of a banking crisis may be more important for countries that had at the time of the crisis a higher initial debt-to-GDP ratio. This hypothesis can be

<sup>11</sup> Output losses are computed as the deviation of the annual growth rate compared to the trend (approximated by the average of annual growth rates over time). The results are qualitatively unchanged for reasonable changes in the threshold value. This is conceptually similar to the cumulative (negative) output gap following a downturn.

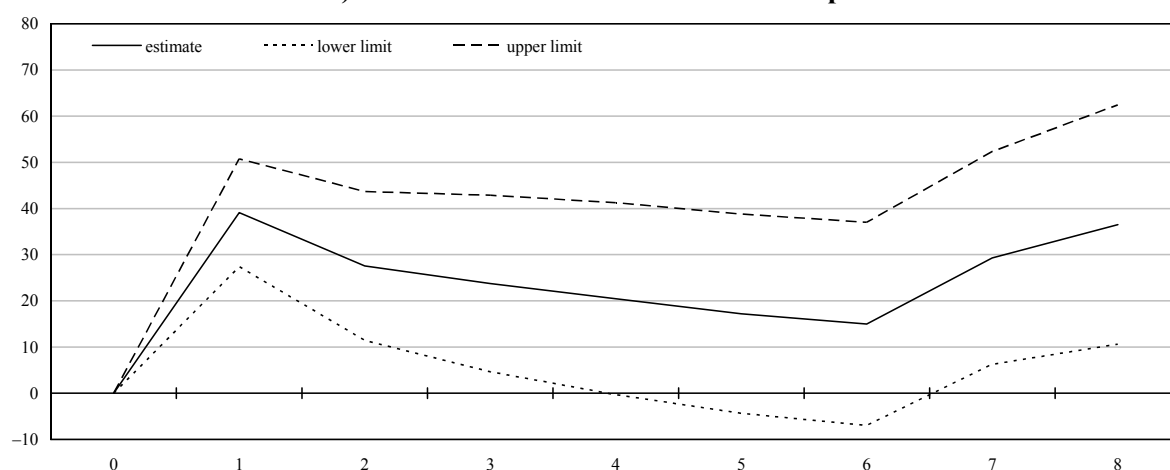
**Figure 7**

**The Effect of Moderate and Severe Banking Crises on the Debt-to-GDP Ratio**  
*(percent of GDP)*

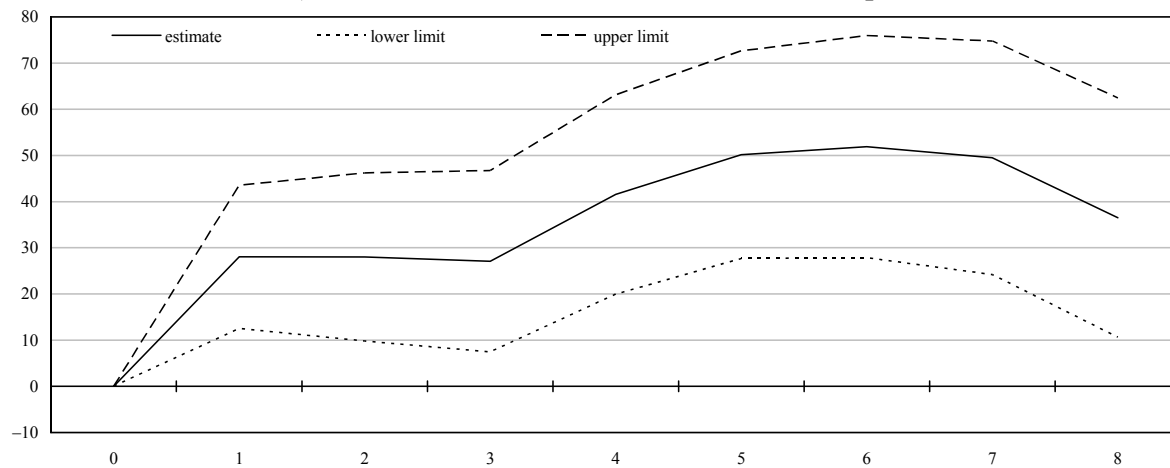
**a) Moderate Crises**



**b) Severe Crises – Full Unbalanced Sample**



**c) Severe Crises – Restricted Unbalanced Sample**



Note: dotted lines represent 90 per cent confidence bands.

explained by the fact that a higher initial level of debt affects the debt accumulation through debt service.<sup>12</sup> In times of crisis, debt service burdens increase due to reduced government revenues and increased risk premia. This last factor tends to be generally more important for countries with a higher initial level of public debt.<sup>13</sup>

To assess the impact of the initial debt-to-GDP ratio on shaping the dynamic response of the government debt-to-GDP ratio to banking crises, equation (1) is augmented by including the initial debt-ratio as a control variable and as an interaction term with the crises dummy:

$$b_{i,t+k} - b_{i,t} = a_i^k + \sum_{j=1}^l \gamma_j^k by_{i,t-j} + \beta_k D_{i,t} + \vartheta^k X_{i,t} + \delta^k (b_{i,t} - \bar{b}) D_{i,t} + \varepsilon_{i,t}^k \quad (2)$$

The interaction term  $(b_{i,t} - \bar{b}) D_{i,t}$  is centred on the (over-time and cross-country) mean to make the interpretation of unconditional effects easier. Based on equation (2), for each period  $k$ , the impact of banking crises on the debt-to-GDP ratio is measured by  $\beta_k + \delta^k (b_{i,t} - \bar{b})$ . This implies that the effect will increase as a function of the initial debt ratio if  $\delta^k > 0$ .

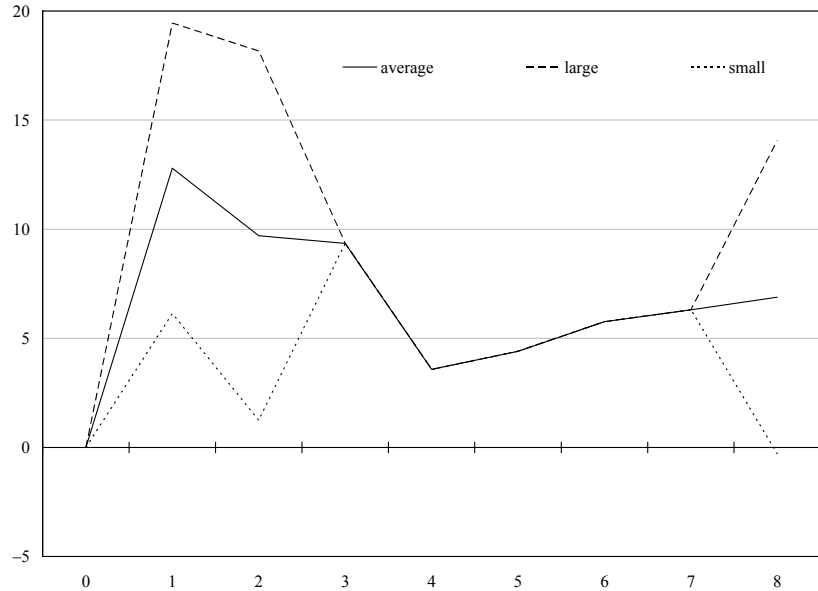
The results reported in Figure 8 tend to confirm the hypothesis that in countries with larger initial level of debt-to-GDP ratio (corresponding to the 3<sup>rd</sup> quartile of the distribution, *i.e.* above 76 per cent) the increase in the debt-to-GDP ratio, both in the short (1 and 2 years after) and in the medium term (8 years after), is about 15 percentage points higher than in countries with lower initial debt (the 1<sup>st</sup> quartile, *i.e.* below 20 per cent).

### 3.4 Foreign public debt

Another factor that may affect the pattern of the public debt-to-GDP ratio in the aftermath of

Figure 8

**The Effect of Banking Crises on Debt-to-GDP Ratio  
Controlling for the Initial Debt Ratio  
(percent of GDP)**



Note: Large and small identify the first and the third quartile of the initial debt-to-GDP ratio distribution. Dotted lines differ from the average response only when the interaction term is statistically significant.

<sup>12</sup> See Figure 10 and 11 for the estimated impact of banking crises on government debt service.

<sup>13</sup> See, for example, Haugh *et al.* (2009), Schuknecht *et al.* (2009), Codogno *et al.* (2003), Gale and Orzag (2003), Gomez-Puig (2006), Manganelli and Wolswijk (2007).

banking crises is the ratio of public foreign debt to total public debt (public foreign debt ratio). First, countries with an high share of foreign public debt may face higher interest payments on debt coming due as capital markets become unwilling to continue rolling debt over. Second, when foreign exposure is heavy, expectations that debt might not be repaid in the case of depreciation may lead to a self-fulfilling liquidity crunch, and eventually to public debt default. Third, in countries with a high foreign public debt ratio currency depreciation may lead to a substantial increase in the debt burden because of the *original sin* and lead to debt crises (Flandreau, 2003; Bordo, 2006; Bordo and Meisser, 2006). Fourth, a high level of foreign public debt may lead to significant output losses, especially in emerging economies, since sudden stops or reversals in capital inflows are more likely.<sup>14</sup>

An approach to test whether countries with a higher foreign public debt ratio have been characterised by an higher rise in the debt-to-GDP ratio in the aftermath of banking crises is to re-estimate equation (2) using the initial level of the foreign public debt ratio as control and interaction term with the banking crises dummy. However, a problem with this approach in this case is that the probability of banking crises is endogenous to the share of foreign public debt.<sup>15</sup>

A way to mitigate this problem is to estimate our baseline equation for different levels of the foreign public debt ratio. For simplicity, and homogeneity with the rest of the results presented, we estimate equation (1) for three groups of countries (observations): i) those with a foreign debt ratio lower than the first quartile of the distribution, *i.e.* below 34 per cent (*low foreign debt ratio*); ii) those with a foreign debt ratio higher than the third quartile of the distribution, *i.e.* above 83 per cent (*high foreign debt ratio*); iii) those with a foreign debt between the first and the third quartile (*average foreign debt ratio*). The IRFs corresponding to the three groups are displayed in Figure 9. The results suggest that the public debt-to-GDP ratio increased more in those countries with a higher share of foreign debt. In particular, in countries with low foreign debt ratio the increase in the debt ratio is not statically significant different from zero. In countries with average foreign debt ratio, the results point to a long term increase of the debt ratio of about 10 percentage points (which is similar to the baseline effect presented in Figure 5). Finally, in countries with high foreign debt ratio the peak effect is close to 30 percentage points, while the long-term effect is about 20 percentage points.<sup>16</sup>

## 4 Conclusions

Financial crises are typically associated with sharp economic downturns but also with a substantial deterioration of fiscal positions. Declining revenues due to weaker economic conditions, higher expenditures associated with bailout costs and demand stimuli have historically led to a rapid deterioration of fiscal balances and increase of public debt. Focusing on the debt-to-GDP ratio and several episodes of banking crises from 1980 to 2006 this paper aims to quantify the evolution of the government gross debt-to-GDP ratio in the aftermath of banking crises. In particular, using a sample of 154 countries the paper estimates impulse response functions of public debt to banking crises.

The results of this exercise suggest that banking crises have produced a significant and long-lasting increase in the government debt-to-GDP ratio, with the effect being a function of the

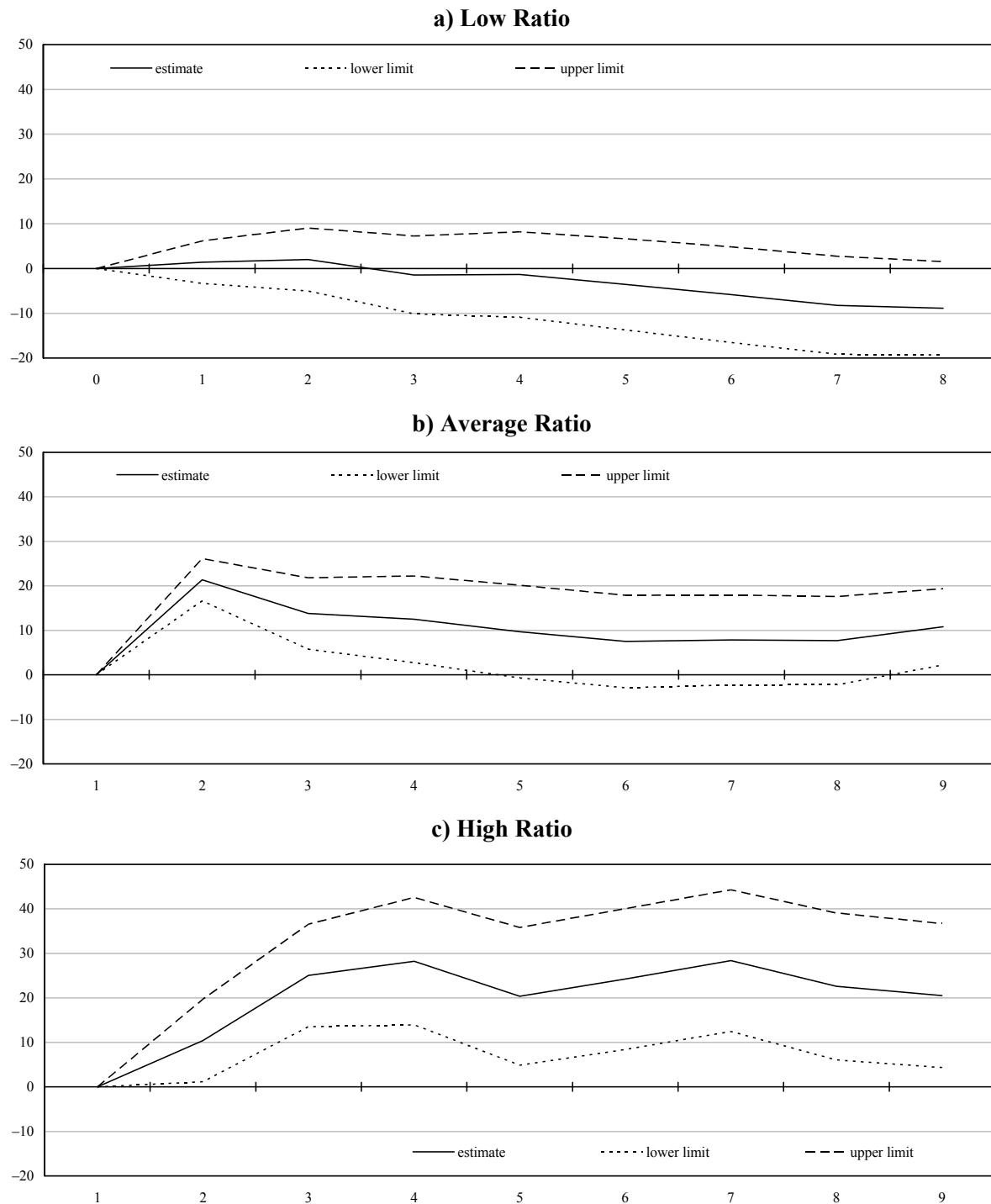
<sup>14</sup> See, for example, Calvo *et al.* (2004) and Bordo *et al.* (2008).

<sup>15</sup> Bordo and Meisser (2006) find that, especially if mismanaged, foreign debt can significantly increase the probability of financial crises.

<sup>16</sup> The results obtained by estimating equation (2), using the initial level of the foreign debt ratio as control and interaction term with the banking crises dummy, broadly confirm these results.

Figure 9

**The Effect of Banking Crises on the Debt-to-GDP Ratio  
for Different Level of Foreign Debt Ratio  
(percent of GDP)**



Note: dotted lines represent 90 per cent confidence bands. Low ratio corresponds to a level of the foreign debt ratio lower than 34 percentage points (1<sup>st</sup> quartile of the distribution); Average ratio corresponds to a level of foreign debt ratio higher than 32 percentage points and lower than 75 percentage points; High ratio corresponds to a level of foreign debt ratio higher than 75 percentage points (3<sup>rd</sup> quartile of the distribution).

severity of the crisis. In particular, for severe crises, comparable to the current one in terms of output losses, we find that government debt-to-GDP ratios increased up to 50 percentage points at the peak, and by 37 percentage points in the medium term (eight years after the crises onset). The effect is considerably lower for moderate crises.

We also find that the increase in public debt in the aftermath of banking crises depends not only on the severity of the crises but also on countries heterogeneity. In particular, analysing a set of structural and policy variables we find that larger increases in debt occurred in countries with worse initial fiscal positions (in terms of debt-to-GDP ratio) and with a larger share of foreign debt.

Summarising, the results of the paper suggest that financial crisis have a significant and long-lasting impact on public debt. This implies that, given the unprecedented severity of the current financial crisis and the associated fiscal policy response, countries urge to take current and further actions in order to avoid temporary stimuli to increase permanently debt levels, thus putting debt sustainability at risk.

## ANNEX

Figure 10

**The Effect of Banking Crises on Debt Service  
Interest Expenditure Over Total Revenue**  
(percent)

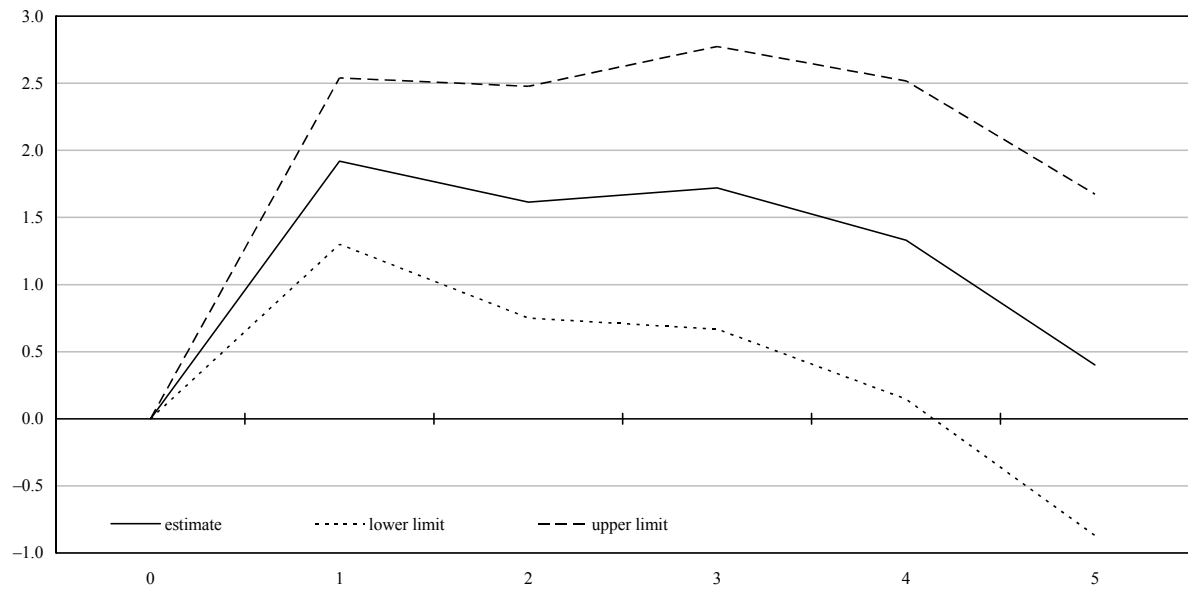
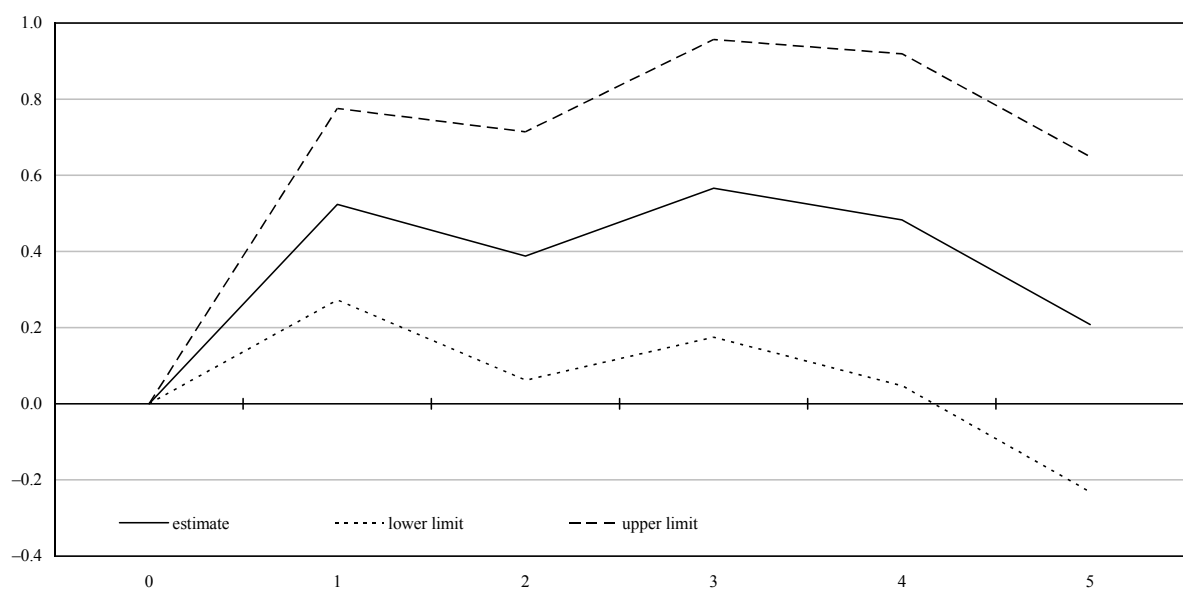


Figure 11

**Interest Expenditure Over GDP**  
(percent)



Note: dotted lines represent 90 per cent confidence bands.



Table 1

## Banking Crises Episodes

Country	Time	Country	Time	Country	Time
Albania	1994	Ecuador	1982	Nicaragua	1990
Algeria	1990	Ecuador	1998	Nicaragua	2000
Argentina	1980	Ecuador	1998	Niger	1983
Argentina	1989	Egypt	1980	Nigeria	1991
Argentina	1995	El Salvador	1989	Norway	1991
Argentina	2001	Equatorial Guinea	1983	Panama	1988
Armenia	1994	Eritrea	1993	Paraguay	1995
Azerbaijan	1995	Estonia	1992	Peru	1983
Bangladesh	1987	Finland	1991	Philippines	1983
Belarus	1995	Georgia	1991	Philippines	1997
Benin	1988	Ghana	1982	Poland	1992
Bolivia	1986	Guinea	1985	Romania	1990
Bolivia	1994	Guinea	1993	Russian Federation	1998
Bosnia and Herzegovina	1992	Guinea-Bissau	1995	São Tomé and Príncipe	1992
Brazil	1990	Guyana	1993	Senegal	1988
Brazil	1994	Haiti	1994	Sierra Leone	1990
Bulgaria	1996	Hungary	1991	Slovak Rep.	1998
Burkina Faso	1990	India	1993	Slovenia	1992
Burundi	1994	Indonesia	1997	Spain	1977
Cameroon	1987	Israel	1977	Sri Lanka	1989
Cameroon	1995	Jamaica	1996	Swaziland	1995
Cape Verde	1993	Japan	1997	Sweden	1991
Central African Republic	1976	Jordan	1989	Tanzania	1987
Central African Republic	1995	Kenya	1985	Thailand	1983
Chad	1983	Kenya	1992	Thailand	1997
Chad	1992	Korea	1997	Togo	1993
Chile	1976	Kuwait	1982	Tunisia	1991
Chile	1981	Kyrgyz Republic	1995	Turkey	1982
China	1998	Latvia	1995	Turkey	2000
Colombia	1982	Lebanon	1990	Uganda	1994
Colombia	1998	Liberia	1991	Ukraine	1998
Congo, Dem. Republic	1983	Lithuania	1995	United Kingdom	2007
Congo, Dem. Republic	1991	Macedonia, FYR	1993	United States	1988
Congo, Dem. Republic	1994	Madagascar	1988	United States	2007
Congo, Republic	1992	Malaysia	1997	Uruguay	1981
Costa Rica	1987	Mali	1987	Uruguay	2002
Costa Rica	1994	Mauritania	1984	Venezuela	1994
Cote d'Ivoire	1988	Mexico	1981	Vietnam	1997
Croatia	1998	Mexico	1994	Yemen	1996
Czech Republic	1996	Morocco	1980	Zambia	1995
Djibouti	1991	Mozambique	1987	Zimbabwe	1995
Dominican Republic	2003	Nepal	1988		

Source: Laeven and Valencia (2008a).

Table 2

**Banking Intervention Policies**

<b>Country</b>	<b>Time</b>	<b>Nationalization</b>	<b>Blanket Guarantees</b>	<b>Liquidity Support</b>
Argentina	1980	1	0	1
Argentina	1989	0	0	1
Argentina	1995	0	0	0
Argentina	2001	1	0	1
Bolivia	1994	0	0	1
Brazil	1990	0	0	1
Brazil	1994	0	0	1
Bulgaria	1996	1	0	1
Chile	1981	0	0	1
Colombia	1982	1	0	1
Colombia	1998	1	0	1
Cote d'Ivoire	1988	0	0	1
Croatia	1998	1	0	0
Czech Rep	1996	0	0	0
Dominican Republic	2003	0	0	1
Ecuador	1998	1	1	1
Estonia	1992	1	0	1
Finland	1991	1	1	1
Ghana	1982	0	0	0
Indonesia	1997	1	1	1
Jamaica	1996	1	1	1
Japan	1997	1	1	0
Korea	1997	1	1	1
Latvia	1995	0	0	0
Lithuania	1995	1	0	0
Malaysia	1997	1	1	1
Mexico	1994	1	1	1
Nicaragua	1990	0	1	1
Norway	1991	1	0	1
Paraguay	1995	0	0	1
Philippines	1997	0	0	0
Russian Federation	1998	1	0	1
Sri Lanka	1989	0	0	0
Sweden	1991	1	1	1
Thailand	1997	1	1	1
Turkey	2000	1	1	1
Ukraine	1998	0	0	1
Uruguay	2002	1	1	0
Venezuela,	1994	1	0	1
Vietnam	1997	0	0	0

Note: "1" refers to the adoption of the policy.  
Source: Laeven and Valencia (2008b).

Table 3

## Estimates

<i>K</i>	Baseline	Time FE	Time Trend	Country Time Trend	Severe	Moderate	OECD
1	13.226 (4.72)***	12.065 (4.30)***	11.908 (4.25)***	12.206 (4.35)***	39.078 (5.51)***	8.447 (2.77)***	15.176 (4.69)***
2	15.893 (4.13)***	13.657 (3.58)***	13.291 (3.48)***	13.869 (3.61)***	27.563 (2.81)***	13.694 (3.27)***	17.372 (3.98)***
3	17.084 (3.75)***	13.903 (3.12)***	13.500 (3.00)***	14.246 (3.15)***	23.746 (2.04)**	15.795 (3.19)***	19.808 (3.76)***
4	12.002 (2.42)**	7.351 (1.53)	7.832 (1.61)*	8.602 (1.76)*	20.470 (1.62)*	10.410 (1.93)**	13.445 (2.34)**
5	12.206 (2.37)**	6.937 (1.4)	7.872 (1.58)*	8.581 (1.71)*	17.220 (1.31)	11.246 (2.02)**	13.706 (2.30)**
6	13.441 (2.57)**	8.365 (1.67)*	9.331 (1.86)*	9.928 (1.96)**	15.012 (1.12)	13.102 (2.31)**	16.109 (2.66)***
7	10.747 (2.05)**	6.671 (1.33)	8.050 (1.61)*	8.116 (1.60)*	29.299 (2.09)**	7.684 (1.36)	13.233 (2.12)**
8	10.910 (2.08)**	8.191 (1.63)*	8.783 (1.77)*	8.856 (1.75)*	36.526 (2.32)**	7.681 (1.38)	13.499 (2.14)**

Note: *t*-statistics in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5, and 10 per cent, respectively.

Table 3 (continued)

## Estimates

<i>K</i>	Severe	Moderate	Small Foreign Debt	Average Foreign Debt	Large Foreign Debt	Debt
1	39.078 (5.51)***	8.447 (2.77)***	1.420 (0.49)	21.358 (7.39)***	10.430 (1.85)*	12.794 (4.84)***
2	27.563 (2.81)***	13.694 (3.27)***	2.000 (0.47)	13.793 (2.83)***	25.029 (3.35)***	9.706 (2.99)***
3	23.746 (2.04)**	15.795 (3.19)***	-1.431 (-0.27)	12.493 (2.11)**	28.246 (3.25)***	9.348 (2.60)***
4	20.470 (1.62)*	10.410 (1.93)**	-1.334 (-0.23)	9.719 (1.54)	20.361 (2.17)**	3.575 (0.96)
5	17.220 (1.31)	11.246 (2.02)**	-3.538 (-0.57)	7.503 (1.19)	24.237 (2.52)**	4.407 (1.18)
6	15.012 (1.12)	13.102 (2.31)**	-5.846 (-0.90)	7.861 (1.28)	28.374 (2.93)***	5.765 (1.53)
7	29.299 (2.09)**	7.684 (1.36)	-8.216 (-1.24)	7.705 (1.28)	22.579 (2.25)**	6.309 (1.65)*
8	36.526 (2.32)**	7.681 (1.38)	-8.872 (-1.40)	10.820 (2.08)**	20.526 (2.09)**	6.883 (1.79)*

Note: *t*-statistics in parenthesis. \*\*\*, \*\*, \* denote significance at 1, 5, and 10 per cent, respectively.

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# IMPLICATIONS OF THE CRISIS FOR PUBLIC FINANCES: THE CASE OF AUSTRIA

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*The economic crisis of 2008-09 has greatly compounded the challenge of economic policymaking both at the EU level and at the national level by causing a permanent loss in potential output – which may reach between 4 per cent and 6 per cent in the case of Austria (Gaggl and Janger, 2009) – and by sharply driving up public deficit and debt ratios.*

*This study highlights the implications these developments are likely to have for fiscal and structural policymaking in Austria. Section 1 outlines how the economic crisis of 2008-09 and upcoming demographic changes would cause public finances to deteriorate significantly and permanently in the absence of consolidation. Section 2 discusses the timing and composition of consolidation strategies: When should policymakers act, and on which areas should they focus? Section 3 concludes.*

## **1 High consolidation needs due to crisis (and ageing societies)**

The global financial and economic crisis has not only caused GDP, and thus real income, to contract in 2009 compared with 2008; it has also caused public finances to deteriorate sharply. The analysis of historical economic crises, especially those associated with a crisis of the banking sector, shows that public deficits – and even more so public debt ratios – may become ‘unsustainable’ in the medium to long term in the aftermath of such crisis. Recent data on, and forecasts of, deficit and debt levels worldwide have confirmed these patterns for European countries and, with some qualifications, also for Austria.

Figure 1 shows the OeNB June 2010 forecast for the Austrian deficit and debt ratio until 2012 (see Ragacs and Vondra, 2010). In 2009 the Maastricht deficit increased by 3 percentage points and is expected to reach 4.5 per cent of GDP in 2010, with the debt ratio developing correspondingly. For 2011 and 2012, the OeNB forecasts slight reductions in the deficit driven by expenditure containment; the debt ratio is projected to increase further. In the following sections we will argue that a large part of the deterioration since 2008 is of a permanent nature.

Thus, the economic crisis jeopardizes the long-term sustainability of public finances, as economic recovery alone will not suffice to lower debt and deficit levels – it will take considerable consolidation measures to achieve that. In addition to the medium- to long-term impact of the global financial and economic crisis and its budgetary implications, the impact of Europe's ageing societies constitutes a further risk to the long-term sustainability of public finances, also for Austria.

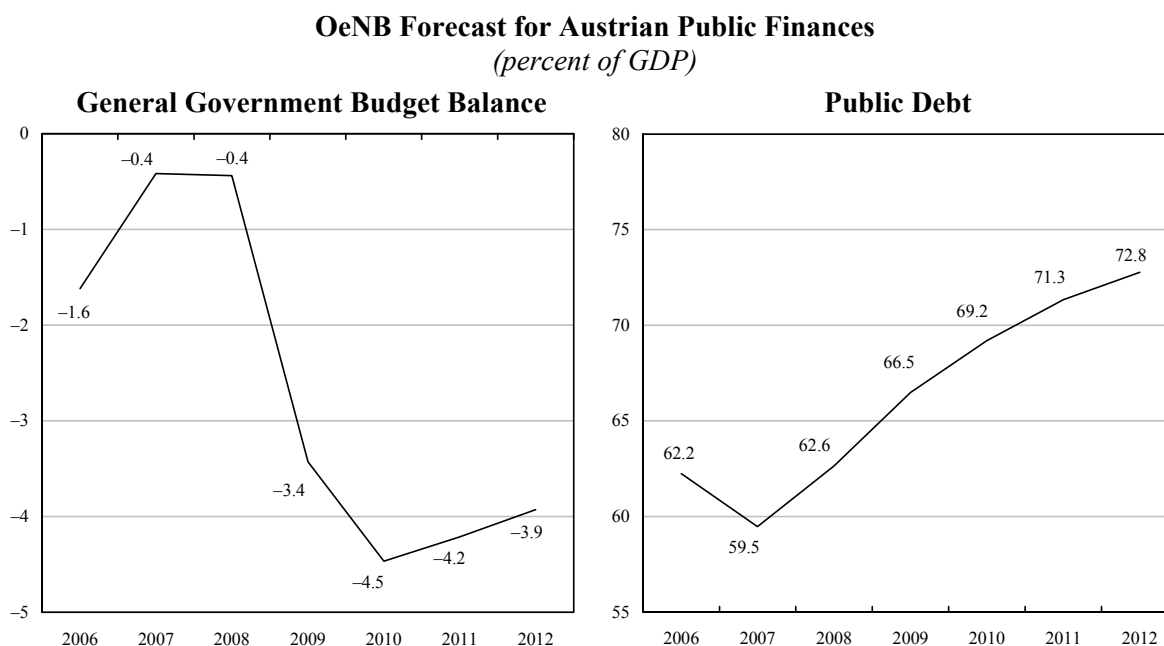
The notion of sustainability is based on the idea of ensuring intergenerational fairness and is aimed at securing fiscal policy leeway in the long run. In this context the ageing-related public expenditures play a key role, as they typically increase the budgetary burden.

Intuitively speaking, fiscal policies will be sustainable as long as governments do not default<sup>1</sup> (Balassone und Franco, 2000). The notions of long-term sustainability of public finances found in the literature fall into three broad families:

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Figure 1



Source: OeNB.

- According to Domar (1944) the public debt ratio should converge to a finite value in order to avoid a continual rise of the tax burden.
- Sustainability as defined in Buiter (1985), Blanchard (1990) and Blanchard *et al.* (1990) requires that the debt ratio converges back to its initial level (in order to prevent the debt ratio from exploding).
- Taking this idea one step further, Blanchard (1990) and Blanchard *et al.* (1990) define a fiscal rule that will ensure the convergence of the debt ratio to its initial level – and thus sustainability. According to this rule, the discounted value of all future primary surpluses equals the current level of public debt.

Even though there is no agreed definition of what constitutes a sustainable position of public finances (Balassone and Franco, 2000), analyses of fiscal sustainability tend to concentrate on the public debt ratio, as a continually growing debt ratio and fiscal sustainability are considered to be a contradiction in terms.

The European Commission assesses the implications of demographic ageing with two sustainability gap indicators named “S1” and “S2” (European Commission, 2005). These two sustainability gap indicators show the size of the budget adjustment that is required to ensure that a given target debt ratio is reached. S1 shows the budget adjustment required to reach a target debt ratio of 60 per cent in 2060, and S2 shows the sustainability gap for an infinite time horizon. In its 2009 Sustainability Report, the European Commission (2009e) finds Austria to have a sustainability gap (S1) of 3.8 per cent of GDP, based on the budgetary position of 2009, the European Commission’s spring forecast and the projected increases in age-related expenditure (European Commission, 2009c); in the “lost decade” crisis scenario, which assumes below-average

<sup>1</sup> A government would be considered to have defaulted on its debt if it is no longer in a position to refinance itself, *i.e.* to place debt securities in the market.

growth until 2020, the sustainability gap would be even 5.3 per cent of GDP. Measured in terms of S2, Austria is found to have a sustainability gap of 4.7 per cent of GDP (or 6.1 per cent of GDP in the “lost decade” crisis scenario).

The following analysis is not based on a specific notion of sustainability, as the prevailing big uncertainty about macroeconomic developments in the future (and thus about estimates for the output gap and/or the structural budget balance of the base year) would not allow for an exact and reliable quantification of adjustment needs. Much rather, the paper shows that it will take fundamental consolidation measures and structural reforms, even under relatively optimistic macroeconomic assumptions, to reach a trend primary surplus that is sufficient to reduce the public debt ratio to a level of or below 60 per cent of GDP and that further measures will be needed to frontload or to reduce the additional fiscal cost of demographic changes.

### *1.1 Structural deterioration of public finances caused by a combination of factors*

Part of the crisis-related deterioration in public finances will have long-term implications, thus creating a need for consolidation in the post-crisis period. The burden on public households has been increased by a range of direct (1) and above all indirect factors (2, 3 and 4):

- 1) fiscal cost of financial market intervention (= direct fiscal cost of financial crises);
- 2) additional debited interest resulting from the sharp rise in debt ratios;
- 3) discretionary fiscal policy stabilization measures (especially if permanent);
- 4) permanent effects of automatic stabilizers following a loss in potential output.

The fiscal effects of financial market interventions include above all the potential cost of guarantees, in case the underlying risks should materialize, and overvalued purchases of problem banks or their toxic assets. These costs loom large in the public mind; yet how big an effect these measures are actually going to have on public finances in Austria, or in other EU Member States or worldwide, is difficult to say at the current juncture. At any rate, these direct costs can be expected to be a mere fraction of the associated indirect costs. According to Cottarelli and Viñals (2009b), even in the current crisis, only a relatively small portion of the expected debt surge is due to official financial support operations. This has been the rule also in past financial crises, as is evidenced by historical analyses provided by Reinhart and Rogoff (2009) or by the European Commission (2009e, Part III).

As Figure 1 exhibits, the public debt ratio is expected to shoot up quickly also in Austria. Currently, we expect the debt ratio to climb by around 10 percentage points from end-2007 to end-2010. The measures taken to stabilize the banking sector actually account for a relatively small share of this increase. The key drivers behind the budget deterioration are the free operation of automatic stabilizers and the discretionary fiscal policy stabilization measures. Even if output were to return to its old path and even if all stabilization measures were to be of a temporary nature, the surge in debt would still have effects into the future through higher interest payments. Given that the average nominal interest rate on public debt currently exceeds average nominal output growth in Austria, as in most other euro area countries, and given that this positive interest rate/growth differential is likely to persist in the next decade, the government will need to achieve a considerable primary surplus to stabilize the debt ratio.

While there has been a case for economic stimulus packages in this global crisis,<sup>2</sup> it is self-evident that such packages create the need for even further adjustments when the crisis is over.

<sup>2</sup> See Almunia *et al.* (2009) for evidence on the relatively high multipliers of discretionary fiscal policies in times of crisis, as well as IMF (2008) for the merits of using stimulus packages in such exceptional periods.

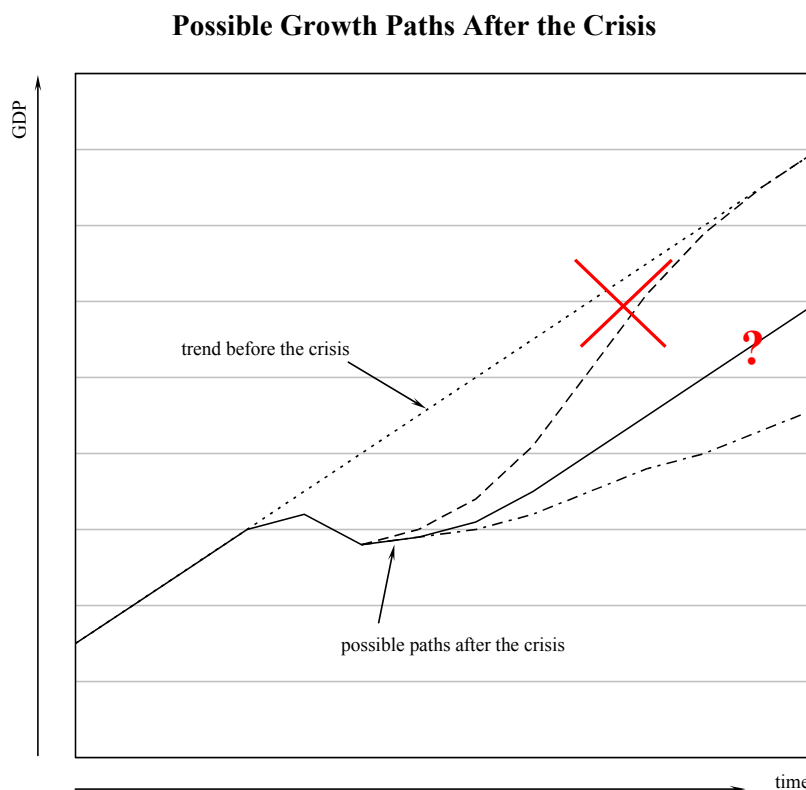
These adjustment needs may go beyond the afore-mentioned higher interest burden if, as is the case in Austria, the bulk of measures is of a permanent nature (like the income tax reform and the permanent increase in family transfers).<sup>3</sup>

It is too early to say whether and, if so, how deeply the economic crisis of 2008-09 may affect potential growth rates of individual economies in the medium term (Gaggl and Janger, 2009). Yet even if the economies were to return to their pre-crisis potential growth rates when the crisis is over, it appears to be unlikely that all of the output loss incurred in 2009 can be recouped in the foreseeable future as the crisis will probably have had permanent negative effects on the levels of trend employment, trend TFP and the capital stock (see Figure 2).

Subject to the free operation of automatic stabilizers, this fact constitutes an additional challenge for fiscal policy, as a comparatively lower output will go hand in hand with lower tax revenues, and as a potentially higher trend unemployment rate will push up social transfers. This means – for a given real trend growth rate of acyclical expenditure – that the cyclically adjusted budget balance is going to deteriorate, resulting in an even higher consolidation need.

Figure 3 shows how these effects add up, comparing the European Commission's spring 2008 forecast (which was still based on the assumption of an economic downturn and not of a severe recession) for Austria's cyclically adjusted general government budget balance<sup>4</sup> and its output gap<sup>5</sup> with the Commission's spring 2010 forecast. The latter brought a *ex post* downward revision of the cyclically adjusted balance for 2006 by 0.5 percentage points and for 2007 by 0.6 percentage points. The European Commission considered a comparatively larger part of the tax

Figure 2



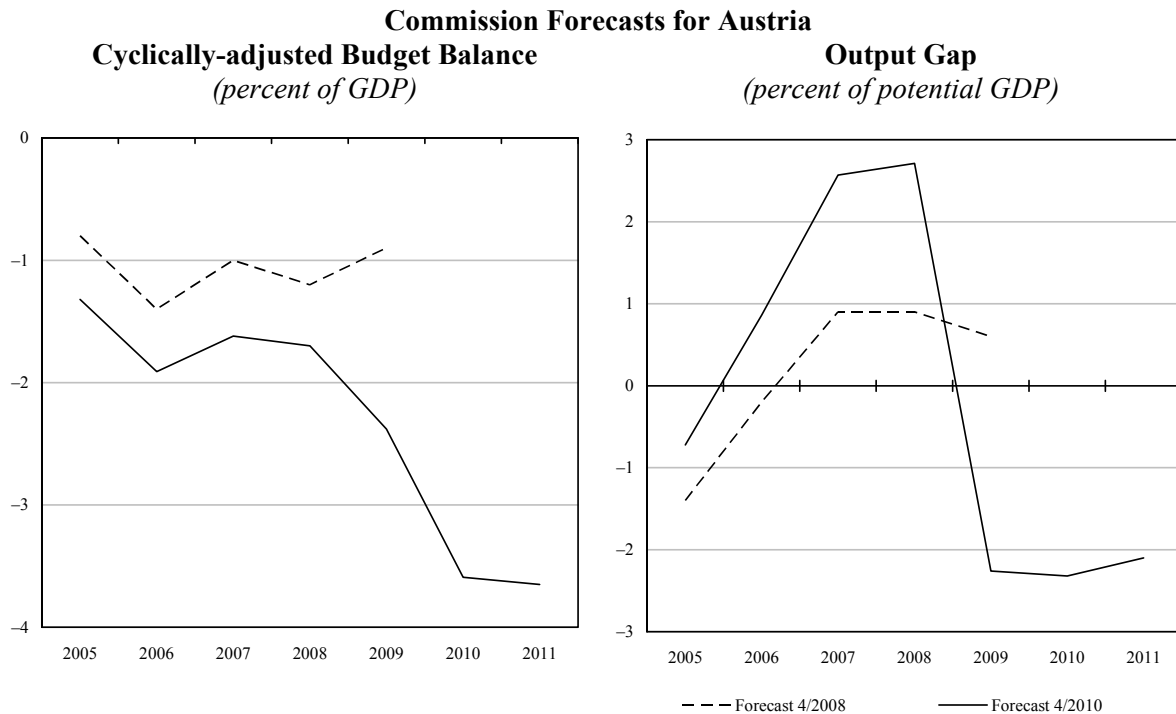
Source: OeNB.

<sup>3</sup> Subject to a very narrow interpretation of “permanent fiscal measures”, the tax reform and increases in some transfers would not qualify as such, as income tax brackets as well as the size of some of the transfers in case (e.g., family allowance) are not indexed. In other words, any additional negative fiscal impact of such measures will be automatically reduced by any bracket creep that may occur in the future, or by any real depreciation of such transfers.

<sup>4</sup> General government budget balance as adjusted for the estimated effect that the business cycle may have through the play of automatic stabilizers.

<sup>5</sup> Difference between current output and potential output in percent (for an extensive discussion of the concepts of potential output and output gap, see Gaggl and Janger, 2009).

Figure 3



Source: European Commission.

revenues of those years to be of a cyclical nature in its spring 2010 forecast – which means that it has become more pessimistic in its assessment of the underlying structural developments. This change in the assessment of Austria's cyclical position is also evident from the sharp downward revision of the output gaps for those years.

Furthermore, the comparison of the successive forecasts for 2009 highlights the effect of the comprehensive discretionary fiscal measures that were adopted after the spring of 2008. Together with the very low growth of potential output estimated for 2010, those measures are a key driver behind the further deterioration in 2010.<sup>6</sup>

## 1.2 Without consolidation, public finances would deteriorate further until 2020

### 1.2.1 Even comparatively optimistic assumptions...

The following scenario is meant to show how Austria's debt ratio and deficit ratio are likely to change, even under optimistic macroeconomic assumptions, should policymakers fail to undertake fiscal consolidation until 2020. This scenario is based on the following assumptions:

- The starting point for our scenario is the OeNB June 2010 forecast for the years 2010 to 2012 (see Figure 1). The output gap in 2012 is expected to be –1.3 per cent of potential output. We assume this gap to close in a linear fashion from 2013 to 2014.

<sup>6</sup> The autumn 2008 forecast was completed shortly before the economic crisis broke out (*i.e.*, before the stimulus packages were adopted). At the time, the European Commission expected Austria's cyclically-adjusted budget deficit to reach 1.2 per cent of GDP in 2010. This forecast has since been revised upward by around 2 ½ percentage points.

- We assume that the temporary measures adopted in 2008 and 2009 will indeed be phased out. Moreover, we expect the revenues from profit-related taxes, which declined more sharply in 2009 than historical elasticities would have suggested, to return to the old trend path by 2014 (so that the GDP share of these revenues will rebound to the 2006 level in 2014). This would allow the government to recoup some of the revenue shortfall that occurred in 2009.
- The trend growth of real GDP and the rise in age-related expenditure for education, long-term care, health care and pensions as a share of real GDP from 2012 onward are based on the latest Ageing Report of the European Commission (2009c).<sup>7</sup> Following comprehensive (parametric) pension reforms in the first half of the last decade, the GDP share of age-related expenditure is projected to rise by roughly ½ percentage point from 2012 to 2020.
- All revenues and other categories of primary expenditure are assumed to grow at a trend rate of 2 per cent (in real terms), which corresponds to the projected average rate of real GDP growth (2013 to 2020) and implies constant structural ratios.<sup>8</sup> Like the European Commission (2007) we also assume the primary balance to have a semi-elasticity of 0.47 with regard to real GDP.
- For 2020, we expect the average real interest rate on public debt to be 2.5 per cent per annum, with interest rates gradually rising to this level from 2013 to 2020. A level of 2.5 per cent roughly matches the average since 1999 and is below the 3 per cent level assumed by the European Commission in its Ageing Report (2009c).
- We have not specifically taken into consideration the government's banking package, as the amounts budgeted so far have negligible effects on the debt ratio (about 2 per cent of GDP in 2009) and on the deficit ratio (roughly neutral).

Our scenario runs until 2020, as this is roughly the point when the effects of ageing on the Austrian economy in general and on public finances in particular are going to increase sharply (see below).

### *1.2.1 ... imply a further rise of the debt ratio in the absence of fiscal consolidation*

Even under this fairly optimistic macroeconomic scenario would the public debt ratio rise to about 80 per cent of GDP until 2020 (see Figures 4 and 5 for an overview). While the budget balance improves until 2014 as the negative output gap is closed, the fact that the debt ratio will have breached the 75 per cent mark by then means that the primary balance would still be more than 1 percentage point below the level that would be necessary (when having a trend real growth rate of 2 per cent and an average real interest rate of 2.5 per cent) to stabilize the debt ratio at this very high level.

Given the growing share in GDP of interest payments on government debt (as indicated by the negative contribution of the orange bars in the figure decomposing the change in the deficit ratio from year to year) from 2.5 per cent of GDP in 2008 to 3.5 per cent of GDP in 2020,<sup>9</sup> we will see even in this period, both the budget deficit and the debt ratio stand to deteriorate further in spite of the until then only slight rise in age-related costs. As noted in Section 1.1, the higher interest rate burden exacerbates the need for consolidation.

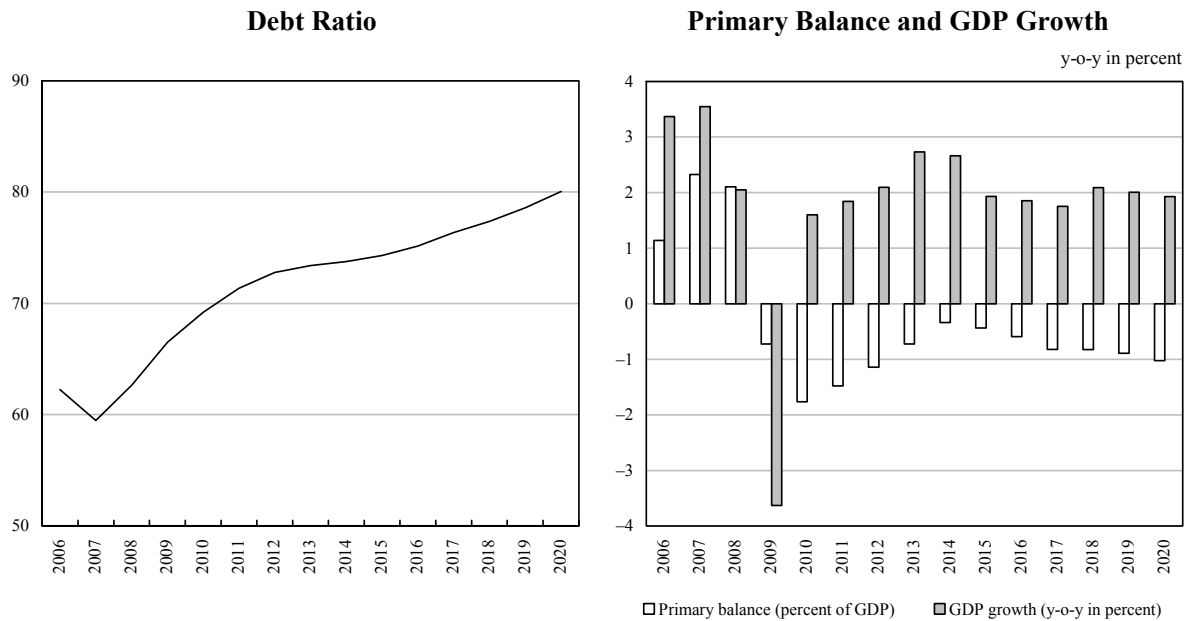
<sup>7</sup> We wish to thank Caroline Haberfellner for having made the underlying data available to us. While these data are based on a different macroeconomic scenario (the assumptions were made before the fall of 2008; see below), the dampening effect of comparatively weaker employment growth and of lower real wages on pension benefits (reflecting lower pensionable earnings and shorter contribution periods of newly retiring workers) will remain limited on pensions in Austria until the medium term, because unlike in other countries, pension benefits are indexed to consumer prices in Austria.

<sup>8</sup> In other words, in this scenario we assume that quantity taxes (such as the petroleum tax), fees, nominally fixed transfers and wage and income tax brackets will be adjusted regularly, or that these factors will offset each other.

<sup>9</sup> In calculating the budget deficit, we furthermore assumed that the GDP deflator would grow by 2 per cent (thus implicitly using the change in the GDP deflator to calculate real interest rates). The results for the debt ratio and for the primary balance would be the same even if we used different assumptions for the inflation rate (see, e.g., Blanchard and Illing, 2009, chapter 27).

Figure 4

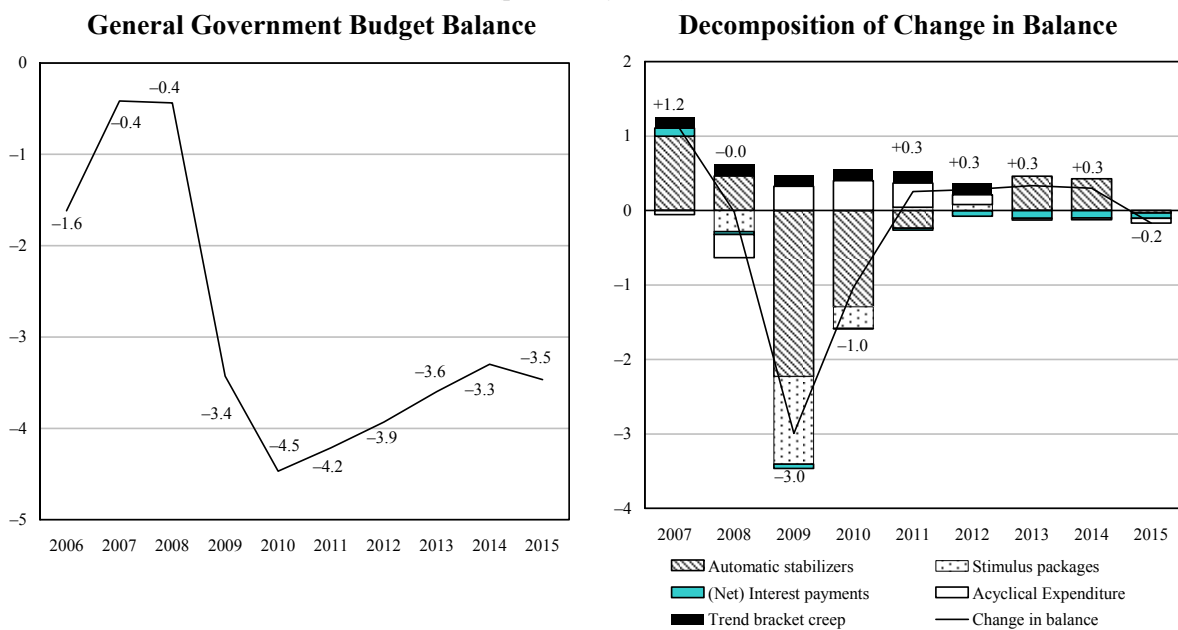
**Scenario: Development of Public Finances Without Further Consolidation**  
(percent of GDP)



Source: OeNB.

Figure 5

**Scenario: Development of Public Finances Without Further Consolidation**  
(percent of GDP)



Source: OeNB.

Figure 5 illustrates the effects of the slow-down in growth on public finances – the light blue bars in the graph for “automatic stabilizers” do not sum to zero between 2006<sup>10</sup> and 2015. When computing the effect of automatic stabilizers on the (change in) budget balance, an average trend growth rate of real expenditure of 2 per cent was assumed. The average rate of real GDP growth in the scenario over this time horizon will, however, be much lower (the loss in potential output until 2014 implied by our scenario is around 5½ per cent compared with the growth rates of GDP in the EC’s (2009c and 2009d) Ageing Report).

The contribution of stimulus packages to the change in the budget balance is strongly negative from 2008 to 2010 (when different measures came into effect) and slightly positive in 2011 and in 2012 (when some parts are expected to expire). From 2009 to 2012 there is a positive effect on the balance of the development of acyclical primary expenditure,<sup>11</sup> a trend which cannot be sustained without structural reforms. The already observed expenditure containment in 2009 can be mainly attributed to the newly implemented budget framework for the federal government (see also Box 1 in Section 2.2.1). This containment is expected to continue over the next few years, which is partly due to a lowering of expenditure ceilings for the period 2011–13. However, a permanent dampening of the expenditure path is rather unlikely without structural reforms, and such reforms have not been announced yet.

A positive contribution over the projection horizon comes from the trend bracket creep in the income tax which vanishes after 2011 due to our assumption of indexation from 2012 on; in Section 2.2.3 we will discuss what would happen if there were no regular adjustments of nominally fixed categories in the Austrian income tax and transfer system.

The scenario outlined here is somewhat more optimistic about the development of the debt ratio until 2020 than the baseline scenario that the European Commission used in its latest Sustainability Report (2009f).

The diverging underlying assumptions make the projections of the individual scenarios hard to compare, though. For instance, the scenarios of the European Commission are implicitly based on a spending elasticity of close to 1 relative to real GDP (with the exception of pension payments). A spending elasticity of close to 1 means that the shares of spending aggregates in GDP will remain broadly constant as long as the demographic composition remains constant. If we assume GDP to have dropped by a cumulative 10 per cent over  $x$  years, this would mean that, say, health care expenditure will likewise have gone down by a cumulative 10 per cent over the same period.<sup>12</sup>

In our scenario, we have expressly refrained from making such an assumption, even though real spending growth will have to go down by necessity during an economic setback in order to avoid an explosion of spending. Yet such measures are in fact already consolidation measures. Moreover, this assumption would imply that, in a short- to medium-term perspective, automatic stabilization would be limited to cyclically sensitive spending categories (typically passive labor market policies).<sup>13</sup>

<sup>10</sup> As of now, the output gap for 2006 is estimated to be slightly positive (see also Figure 3). So the sum of the bars in Figure 5 slightly overestimates the negative impact of automatic stabilizers.

<sup>11</sup> When computing the effect of acyclical primary expenditure on the balance, we controlled for cyclical price developments and the direct effects of pension and/or public wage increases on public revenue. Furthermore, we excluded expenditure increases related to stimulus measures.

<sup>12</sup> This assumption is controversial. It does, however, explain why, in the lost-decade scenarios of the European Commission’s Ageing and Sustainability Reports, the additional cost of ageing in percent of GDP is shown to be largely driven by pensions for Austria but also for the EU average, whereas the share of health-care expenditure in GDP remains basically unchanged when compared with the baseline scenario.

<sup>13</sup> In reality, though, the public sector automatically creates stabilization effects for the real economy by continuing to pay public pensions, retaining public employees, etc.



The minimum structural adjustment need highlighted by our scenario exceeds the 1 per cent of GDP that would be necessary in the short run to stabilize the debt ratio (as outlined above) at the level of 2014. After all, the demographic changes start to affect public households already in the second half of the 2010s, by raising costs for pensions, health care and long-term care, and above all by reducing trend growth. Lower output growth, in turn, increases the primary balance required to stabilize debt, while at the same time causing the actual primary balance to shrink through the effect of the automatic stabilizers. However, the automatic stabilizers affect the primary balance only through weaker tax revenue growth as the slowdown in output growth reflects a smaller supply of labor rather than a rise in the unemployment rate.

### *1.3 Developments from 2020 shaped by demographic change*

From roughly 2020 onward, the budgetary pressures of demographic change will increasingly add to the repercussions of the economic crisis. This shift in the weight of the driving factors makes 2020 an ideal end point for our scenario.

The Ageing Report of the European Commission (2009c) projects the working-age population in Austria to keep increasing until 2020, but to decline thereafter (see Table 1 for an overview of key demographic metrics and projected age-related costs for Austria for the period from 2007 to 2060).<sup>14</sup> While the overall population will keep growing beyond 2020, partly through migration, the share of the population aged 65+ will increase by a disproportionately large extent.<sup>15</sup> The reduction in the working-age population will cause potential output growth to drop relatively sharply,<sup>16</sup> which will in turn hurt growth of tax revenues and social security contributions.

At the same time, these projected dynamics – growth of total population, reduction of working-age population – imply that in the absence of offsetting measures the growth rate of public spending will exceed that of revenues or GDP. This is especially true for spending on health care and on long-term care. The pension reforms that Austria adopted between 2001 and 2005<sup>17</sup> actually keep the rise in pension expenditure relatively low compared with other EU countries. Due to these measures, Austria boasts the fourth-lowest real increase in average pensions in the period from 2007 to 2060 within the EU; and within the euro area, Austria is outperformed only by Italy (European Commission, 2009d, Table A66).<sup>18</sup> This is also an important reason why the overall increase in ageing-related fiscal costs is estimated to be under the EU average.

Until roughly 2020, the projected rise in the spending ratios for health care, pensions and long-term care is broadly offset by a considerable decline in the share of spending on education in GDP. The number of students is expected to bottom out in absolute terms around 2020 (European Commission, 2009d, Table A111). From 2020 onward, the share of age-related expenditure in GDP is projected to rise by 3 percentage points until 2050, and to shrink somewhat until 2060.

In the baseline scenario of the Ageing Report the rise in spending is driven not only by purely demographic factors, but also by rising demand (especially for public health care). Some of

<sup>14</sup> The macroeconomic assumptions for the baseline scenario were taken before the summer of 2008, *i.e.* before the economic crisis hit Europe with full force. This is why the results in Table 1 on employment and potential output growth in 2010 and the figures on age-related expenditure as a percentage of GDP are not directly comparable with the scenario until 2020 in Section 1.2.

<sup>15</sup> This causes the dependency ratio to rise sharply.

<sup>16</sup> The baseline scenario projection reflects the assumption that the labor market participation of the working age population (15-64) will rise, that the unemployment rate will drop slightly, and that productivity growth will remain broadly constant in Austria over the period from 2007 to 2060.

<sup>17</sup> Among other things, the reforms provided for longer averaging periods and lower accrual rates. However, some reforms were subsequently diluted somewhat, *e.g.*, through the extension of the early retirement scheme for workers with long employment histories.

<sup>18</sup> However this may raise the issue of “social sustainability”.

Table 1

## Key Results of the Ageing Report for Austria

	2007	2010	2020	2030	2040	2050	2060
<i>(millions)</i>							
Total population	8.3	8.4	8.7	9.0	9.1	9.1	9.0
<i>(share of total population, percent)</i>							
65 years and above	16.9	17.6	19.4	23.7	27.2	28.2	29.0
below 15 years	15.6	14.9	14.3	14.1	13.6	13.5	13.8
<i>(annual change, percent)</i>							
Working-age population (from 15 to 64 years)	+0.2	+0.4	+0.1	-0.6	-0.1	-0.2	-0.3
Employment	+0.7	+0.6	+0.2	-0.2	-0.2	-0.2	-0.2
Potential GDP	+2.2	+2.2	+1.9	+1.5	+1.5	+1.5	+1.5
<i>(percent of GDP)</i>							
Age-related expenditure	26.0	25.7	26.2	27.7	28.6	29.3	29.0
<i>of which: Pensions</i>	12.8	12.7	13.0	13.8	13.9	14.0	13.6
<i>Health care</i>	6.5	6.6	7.0	7.4	7.8	8.1	8.0
<i>Long-term care</i>	1.3	1.3	1.4	1.7	2.0	2.4	2.5
<i>Unemployment</i>	0.7	0.6	0.6	0.6	0.6	0.6	0.6
<i>Education</i>	4.8	4.5	4.1	4.2	4.2	4.2	4.3

Source: European Commission (2009c, 2009d).

the assumptions underlying the Ageing Report for the long-term projections for Austria are controversial, like the assumed strong decline in early retirements.

Looking ahead, based on current knowledge, the additional costs arising from ageing would appear to be higher than the additional costs created by the global economic crisis.

#### 1.4 Summing up: Large consolidation effort of about 4 per cent of GDP will be necessary in the medium term

Summing up the results from the scenario in Section 1.2 and the projected effects of ageing in Section 1.3, one could approximate the overall necessary consolidation (and structural reform) effort as follows:

After the output gap has closed and crisis-related temporary effects have run out (expiration of temporary stimulus measures, unwinding of revenue shortfalls) the primary balance will be around -1/3 per cent of GDP in our scenario (in 2014). As said before, assuming a trend growth rate of 2 per cent and an average real interest rate of 2.5 per cent, the primary balance of 2014 (the year with the best primary balance in our scenario) has to be improved by about  $\frac{3}{4}$  percentage points to reach the 0.4 per cent of GDP which would be necessary to bring down the debt ratio again.

Frontloading the increase in age-related expenditure would roughly take another 3 per cent of GDP. So the overall effort required for consolidation and structural reform is close to 4 per cent

of GDP, which is in line with the most recent sustainability gaps calculated by the European Commission of 3.8 per cent of GDP (S1) and 4.7 per cent of GDP (S2), respectively.

As said before, a lower rate of trend GDP growth implies further consolidation efforts: To give an example: When trend GDP growth shrinks from around 2 per cent to around 1.5 per cent (given an unchanged real interest rate of 2.5 per cent), the primary balance needed to stabilize the debt ratio becomes twice as high. Furthermore a lower trend growth also means that the yearly increases of public expenditure in other areas need to be contained. While the growth of subsidies may be reduced by itself (as lower activity could mean a lower demand for subsidies), that may not be the case in other areas. Given that labour productivity growth is projected to remain constant (see EC, 2009d), growth of average wages can be expected to remain constant as well. And as the overall population of Austria will presumably continue to grow (see Table 1), it might be difficult to contain spending growth in areas like general public services and public order and safety without implementing any reforms.

## 2 When and how to consolidate?

The following section essentially deals with the action required to offset the rise in the deficit and debt ratios in the aftermath of the economic crisis of 2008-09. Economic policy measures that may be taken to counter the problem of demographic change are also touched upon in this section.

### 2.1 Fundamental considerations

Given the sharp global contraction, the expansionary fiscal measures that policymakers adopted by concerted international action to dampen the setback and stabilize the real economy have driven up public deficits. If the consolidation drive of the coming years is to be a success, it will have to go beyond a mere stabilization of the debt ratio once the crisis is over. There are three reasons for this:

- First, the government will have to create scope for the operation of the automatic stabilizers and for discretionary measures that may have to be taken in future crises<sup>19</sup> – in other words, the government will have to strengthen Austria's resilience to shocks. As evidenced by Nowotny (2009), the stabilizing function of fiscal policy had been limited since the 1980s because of insufficient action to reduce structural deficits.
- Second, the challenges that result from ageing populations, as outlined in Section 1.3, will have to be tackled. These challenges alone imply that the medium-term need for fiscal adjustment and structural reforms will go far beyond the short-term requirements under the corrective arm of the Stability and Growth Pact (reducing the deficit ratio to below 3 per cent).
- Third, Austria will have to meet the requirements of the European fiscal framework (see below).

#### 2.1.1 Coordinated action within the European fiscal framework is required ...

While the principle necessity of post-crisis consolidation is undisputed, there is a lack of agreement about when the crisis would be considered to be over, and about when to actually launch consolidation measures. Making the start of consolidation contingent on a self-sustained economic revival is equally problematic. The contraction bottomed out. However, unwinding expansionary

<sup>19</sup> According to an IMF analysis of the packages adopted by India, China and the G-7 countries, countries with originally lower debt ratios have tended to put together bigger packages (Horton and Ivanova, 2009).

fiscal measures too soon could jeopardize the as yet fragile recovery<sup>20</sup> and would thus prolong the recession and increase unemployment (and hence undo previous improvements of the fiscal situation to a certain extent); there is no unambiguous empirical evidence for the existence of non-Keynesian effects in this context.<sup>21</sup>

Given the high degree of international economic integration, national consolidation measures have dampening effects on trading partners' economies. These spillover effects and the prevention of free-riding behavior essentially call for consolidation strategies to be coordinated internationally similar to the way support measures have been coordinated.

For the EU Member States, the Stability and Growth Pact constitutes an operational framework for coordinating the timing and extent of consolidation. Under the provisions of the excessive deficit procedures under Article 104 (7) of the Treaty, the earliest possible start of consolidation as well as the year until which the deficit must have been brought back below 3 per cent of GDP have been laid down for the countries concerned. Moreover, the minimum structural consolidation that is to be achieved per year during the respective period has been specified. The recommendations and requirements of the European Commission or of the European Council are guided by the principle of taking adequate account of national conditions and particularities, such as the size of the economic or fiscal contraction, or the size of the debt.

Based on the recommendations of the European Council (2009) made at the end of November 2009, Austria should continue implementing the fiscal measures under the stimulus package in the first half of 2010. At the same time, Austria is expected to develop a detailed consolidation strategy until June 2010, which it should start implementing in 2011, so as to remove the excessive deficit by 2013 (this is the deadline for most euro area countries in EDP). Consolidation should moreover be designed to reverse the trend in the government debt ratio, so as to ensure a gradual reduction to the reference value of 60 per cent of GDP in the foreseeable future.

### *2.1.2 ... and a credible long-term strategy that is communicated as soon as possible*

According to the OECD (2009f), it would be important to target a smooth transition between phasing out temporary support measures stimulating the economy and strengthening financial market stability, and phasing in structural measures with a medium- to long-term horizon. When unwinding temporary stimulus and stabilization measures too late, policymakers run the risk of destabilizing expectations, thus undermining the effect of the implemented measures and raising the actual need for consolidation (through rising interest payments on public debt).

As argued by Giavazzi (2009) structural reform measures promising medium-term savings – such as the introduction of fiscal rules or medium-term finance plans; raising the regular retirement age – should have priority, in order to convince investors that policymakers really mean to resume sound fiscal policies and in order to prevent investors from demanding risk yields on sovereign bonds. While such measures do dampen spending in the medium term, they do not imply any short-term setback in demand.

In principle, there can also be negative effects on economic activity from the sole announcement of consolidation measures, for example when finite-lived forward looking agents take future decreases in monetary transfers into account and decrease consumption immediately.

<sup>20</sup> The situation might be different in some other EU countries where – regardless of possible negative effects on the recovery – consolidation had to start immediately due to strongly elevated spreads on government bond yields which signal doubts on the solvency of these countries.

<sup>21</sup> See Prammer (2004) for an overview of non-Keynesian effects, a description of the conceptual frameworks and an assessment of their empirical relevance.

However, such negative effects of announcements should be very limited: Government consumption and government investment use up resources and so changes in these aggregates affect GDP when they take place, and empirical studies on quasi-experiments with tax rebates indicate that even the timing of monetary transfers matter (which might be due to liquidity constraints and/or myopia; see for example Blinder, 2004).

## 2.2 *Where to start with consolidation?*

The potentially most controversial issue is the question of which taxes to increase, and which spending items to cut. Public interventions in time of crisis and exit policies may have highly divergent effects on macroeconomic developments, depending on the design of the measures and the starting conditions (see also the example of Japan versus Sweden and Finland in Gaggli and Janger, 2009).

### 2.2.1 *Spending cuts and, if need be, higher “growth-friendly” taxes...*

A (sustainable) consolidation strategy hinges above all on an adjustment of the primary balance, which may a priori be achieved through spending cuts or revenue increases. Empirical evidence suggests that consolidation measures tend to be more successful (i.e. more sustainable) when they are based on spending cuts (e.g., Ardagna, 2004; European Commission, 2007, part IV).

Spending cuts should, as much as possible, be supported through an increased output orientation and measures that raise efficiency. In this respect, the new federal budget law (see box 1) may create a positive momentum, as may efforts to improve the quality of the public finances in general (e.g., Haberfellner and Part, 2009). As already indicated in Section 1.2.2, first effects of the new budgetary framework could already be observed in 2009 where growth in federal expenditure was extraordinarily low. Low growth of public wages and intermediate consumption implied by low growth of expenditure ceilings in 2011 and 2012 are the only fiscal adjustment effort included in the OeNB's June 2010 forecast presented in Section 1.

Measures to improve the incentive structures of the fiscal sharing scheme (Schatzenstaller, 2006)<sup>22</sup> as well as measures to enhance the efficiency of public administration at all levels of government and in the area of health care and education have typically been cited as ways to achieve this goal (e.g., during the latest IMF article IV consultations with Austria, see IMF, 2009 and 2010b). Furthermore the Austrian Institute for Economic Research suggests reducing the level of capital transfers and subsidies to private sector companies, which are very high in Austria by international standards (see Aiginger *et al.*, 2010).

On the revenue side, policymakers would be well advised to consider redistribution effects as well as the “growth friendliness” or the allocative effect of different options. Based on an empirical study by Johansson *et al.* (2008), the OECD (2009e) has formulated the general recommendation of raising taxes on immovable property and consumption (above all the consumption of goods with negative externalities such as alcohol, tobacco and fuel).

Likewise, the IMF (2009) advised Austria against increasing the tax burden on labor, recommending petroleum tax and tax increases on immovable property instead,<sup>23</sup> thus mirroring the recommendations identified by the Austrian Institute of Economic Research (Aiginger *et al.*, 2010).

<sup>22</sup> For instance, it has often been criticized that compulsory school teachers are regional civil servants but paid by the central government (see also Government Debt Committee, 2009).

<sup>23</sup> The IMF estimates that those measures might contribute up to ¾ per cent of GDP to consolidating the budget.

**Box 1**  
**New (Federal) Budget Framework in Austria**<sup>24</sup>

The Austrian Parliament adopted the Austrian Federal Budget Reform in December 2007. As this reform is quite large in scale, it is implemented in two stages.

The first stage was implemented in 2009 with the introduction of a legally binding 4-year medium-term expenditure framework (MTEF) including an explanatory strategy report. The binding ceilings are enacted into law. The ceilings for about 80 per cent of total expenditure are fixed in nominal terms. Nevertheless, some expenditures which either heavily depend on the business cycle or on total tax revenues have variable ceilings based on certain indicators (e.g., unemployment benefits).

The five headings of the Medium Term Expenditure Framework (1. General Government Affairs, Court and Security; 2. Employment, Social Services, Health and Family; 3. Education, Research, Art & Culture; 4. Economic Affairs, Infrastructure and Environment; and 5. Financial Management and Interest) represent the main policy fields. Expenditure ceilings are set on the heading level as well as for the underlying budget chapter level representing the different ministries' portfolios. These ceilings are binding – at the heading level for four years, at the chapter level for the following year. The chapter level limits for the other three years will be of a merely indicative character. At the same time, incentives for line ministries to use resources more efficiently have been created by granting them more flexibility in building reserves and allowing them to carry forward appropriations from one year to another.

The spending ceilings are adopted, and may be changed, by Parliament. The MTEF is expected to tighten spending discipline. By offering a stable framework, the MTEF should contribute to sustainable public finances.

The second stage of the budget reform consists of a new budget structure (global budgeting instead of line item budgeting), result-oriented management of state bodies, accrual accounting and budgeting and performance budgeting and will take effect in 2013. The current budget law primarily focuses on inputs; the second step of the reform aims at interweaving input-, output- and outcome information in the budget documentation in a consistent and transparent manner. Outputs and outcomes will be formulated for all policy fields on all budgetary levels – with a focus on priorities to prevent an administrative overkill. As the objective of the reform is to create better instruments for management decisions, for budget steering activities as well as improved information for politics, administration and the public about the financial status of the ministries and the federal sector, there is also the need to reform the accounting and budget system.

Moreover, there is the potential to raise additional revenue by correcting the relative discrimination of owning fixed-income financial assets (interest and dividend income are subject to taxation while capital gains are only taxed under very specific circumstances).

<sup>24</sup> For further information see Meszarits *et al.* (2008).

Payroll and wage taxes as well as relatively high social security contributions push the average and marginal tax burden of Austrian workers with low or medium wages far beyond the corresponding OECD and EU-15 averages (OECD, 2009d). This is why policymakers would be well advised not to increase taxes on labor any further (Haberfellner and Part, 2009). We also wish to point out that – from an incentive perspective – the tax burden on labor needs to be assessed together with the transfer system, as upper income limits or progressive adjustments of transfers raise effective marginal tax rates.

### 2.2.2 ... supported by structural reforms which raise potential output

Sustainable consolidation strategies go beyond improving budgetary conditions by effectively contributing to raising the growth path in the medium run. A comparatively higher growth path will, in turn, create leeway for fiscal policy. This section discusses shortly which measures could raise the path of potential output and support fiscal consolidation.<sup>25</sup>

Due to demographic change increasing the labor supply will be a crucial task for economic policy to dampen the decrease in trend growth. In Austria there is potential to increase the participation rates of specific groups, such as older workers, women, migrants and low-skilled workers.

In spite of increasing life expectancy, the average retirement age has declined by about three years since 1970 for both men and women (Sozialversicherung, 2009).<sup>26</sup> In 2008, the employment rate of older workers was far below the EU-15 average (41 versus 47.5 per cent). The OECD (2007) suggests limiting invalidity pensions and other possibilities for early retirement (such as the early retirement scheme for workers with long employment histories) to raise the *de facto* retirement age. Such a measure would have to be accompanied by measures to increase the employability of older workers (such as flattening the seniority wage curve and enhancing lifelong learning and the acquisition of transferable skills). Obviously, reforms in this area would also have direct fiscal implications by decreasing the growth rate of pension expenditure.

At 65 per cent, the employment rate of women in Austria was about 5 percentage points above the EU-15 average in 2008, but below the average of Switzerland and the Nordic countries. Furthermore, the share of part-time employment is very high; especially for women above 30 (see Grossmann *et al.*, 2009). This can be attributed to the system of half-day schooling and the limited supply and quality of formal childcare. The OECD (2009b) has, among other things, identified the training of kindergarten teachers as well as the sharing of competences between federal and regional government as possible areas for improvement in the latter area. Changing to a system of full-day schooling and following the OECD's recommendations on child-care could not only raise female labor supply, but also enhance the quality of labor in the future. Thereby it would also ease the integration of migrants (and their descendants) into the labor market.

Despite relatively high (and above EU-average) spending on research and development, there is some potential in Austria to increase potential output by raising aggregate productivity. Possible measures include improving the supply of risk capital, a reform of the financing of universities, fostering competition in the service sector (more resources for regulators, measures to increase price transparency ...) and so on.<sup>27</sup>

<sup>25</sup> More details can be found in Grossmann *et al.* (2009) and Janger and Reinstaller (2009).

<sup>26</sup> In 2008, the effective retirement age for old age pensions was 62.7 years for men and 59.5 years for women, compared with 53.7 years or 50.3 years for invalidity pensions. Invalidity pensions have been sharply on the rise compared with old-age pensions since 2003, accounting for roughly one-third of the annual number of new pensions (Sozialversicherung, 2009).

<sup>27</sup> For more recommendations in this area see Grossmann *et al.* (2009); Janger and Reinstaller (2009); Aiginger *et al.* (2006); and the OECD's economic survey on Austria (2007).

### 2.2.3 Temporarily higher inflation is no viable option

In the literature, allowing for higher inflation rates is also discussed as a possible solution, for example by Rogoff (2008) (in the context of public and private debt).

One channel is seigniorage: The amount of cash in circulation in the euro area is about 9 per cent of GDP, so a 1 per cent increase in the price level leads to non-recurring seigniorage revenue in the range of 0.1 per cent of GDP, which also corresponds to the G7-average estimated in Cottarelli and Viñals (2009a).

Furthermore, an unexpected rise in inflation would lead to a real devaluation of the non-indexed medium-to-long-term part of outstanding public debt which is denominated in domestic currency. The IMF (2010a) estimates that an annual inflation rate of 6 per cent from 2009 to 2014 in highly developed major economies would depress the debt ratio by an average of 8 to 9 percentage points by 2014 (compared to the 2014 debt ratio in a baseline scenario with an average growth of the GDP deflator of about 2 per cent). For euro area countries, the estimates are close to 7 percentage points for Germany and 10 percentage points for France, the latter having a much higher non-indexed medium-to-long-term debt compared to GDP. Austria has a lower share of short-term debt than most other OECD countries (see Cecchetti *et al.*, 2010); when accounting for SWAPs, the foreign currency share in overall debt is around 3 per cent (as of January 2010) and the debt ratio is slightly below the ones of France and Germany. So the effect of the IMF scenario in Austria should be in the range of 10 percentage points.

However, higher inflation would also devalue claims held by the government, like holdings of participation capital in Austrian banks under the support measures for the financial sector.<sup>28</sup>

A crucial factor for the “success” of inflating away part of the debt is the disinflation period. If the disinflation is not credible and inflation premia and nominal interest rates remain high, governments would have to pay high real *ex post* interest rates. So the financing needs of governments during this period are an important determinant for the long-run effects of temporarily higher inflation.<sup>29</sup>

However, one has to be aware that the current situation differs from past episodes of high public debt ratios, which have typically been the result of warfare. While wars may sharply drive up national debt levels, the primary balance will, as a rule, improve automatically once the war is over (as military expenditure goes down again; see also Reinhart and Rogoff, 2010). This is indicated in Figure 6, which shows the development of public finances before, during and after warfare in the UK and the US. For both countries we see a huge increase in the debt-to-GDP ratio during wartime and a substantial improvement in fiscal balances (a proxy of the primary balance in the case of the US and the change in debt for the UK) which is driven by a large drop in defense spending.

At the current juncture, however, deficits are likely to remain high without substantial consolidation. A real devaluation of outstanding public debt would indeed reduce the effect of additional interest payments by (at least temporarily) lowering the debt ratio, yet it would have no direct impact on the primary balance, which has deteriorated permanently given a loss in output and lasting economic stimulus measures.

Furthermore, average debt maturities have shortened during the crisis in many countries (including Austria), which further increases financing needs in the short-to-medium term.

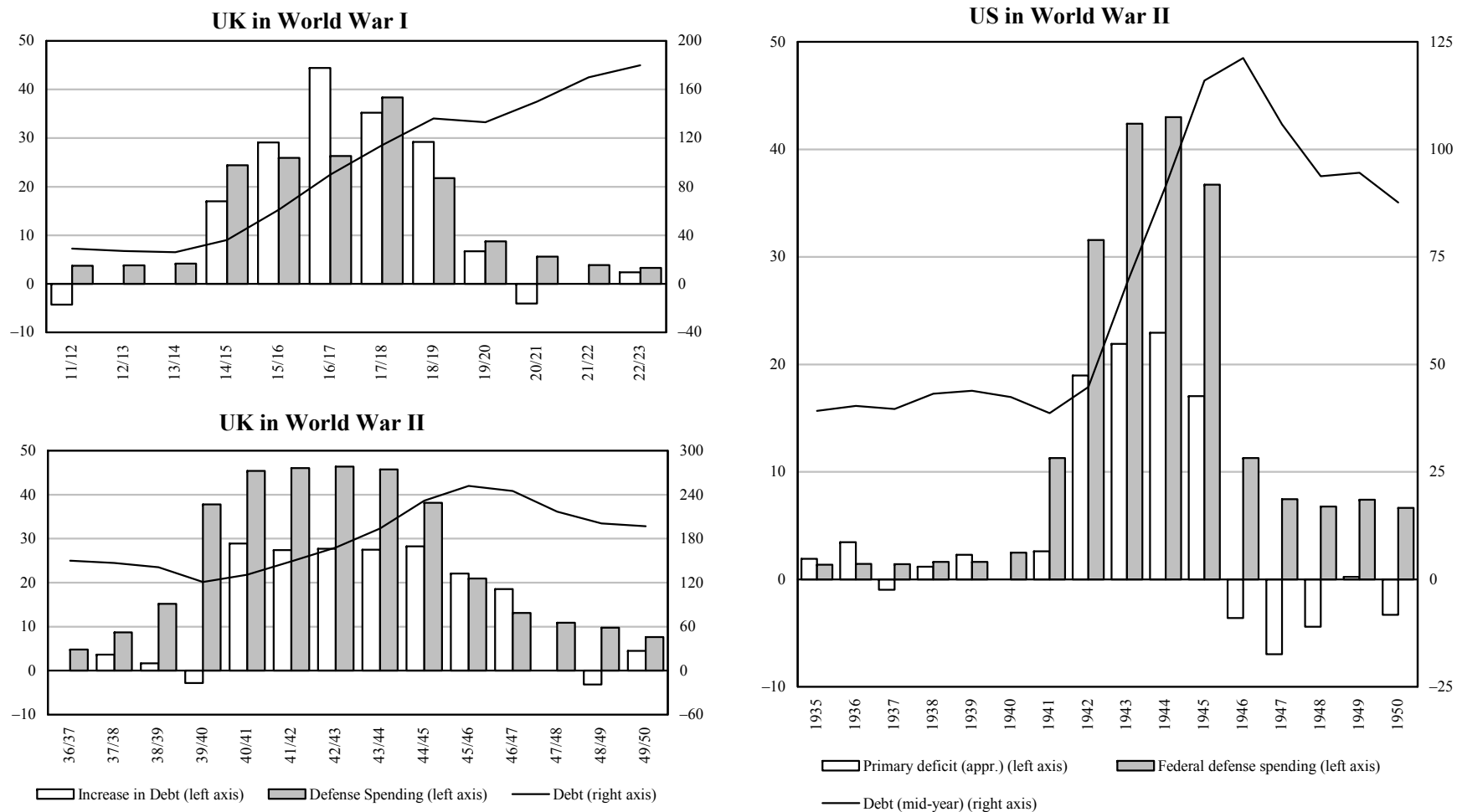
<sup>28</sup> In 2008 actual interest payments by the government were 2.5 per cent of GDP while received interest income was 0.6 per cent of GDP.

<sup>29</sup> One possible way to circumvent these adverse effects on public finances in the disinflation phase would be to issue inflation-indexed bonds (which would also prevent a rise in real interest rates via higher inflation uncertainty premia).



**Figure 6**

**Wars, Deficits and Debt: Experience of US and UK**  
(percent of GDP)



Source: ukpublicspending.co.uk, US Bureau of Economic Analysis, US Treasury.

The probably most important argument against using high inflation for easing the interest burden on public debt is that such a policy would have substantial negative effects on the real economy like distortions in resource allocation (see IMF, 2010a) and a loss in confidence in (monetary) policy institutions. It could also substantially hurt households in the middle class, as their portfolios usually have a much higher share of fixed-income products than the richest households (see Fessler and Schürz, 2008, for Austria).

Higher inflation rates could, however, substantially affect the primary balance indirectly via the non-neutrality of inflation in the tax system and a real devaluation of nominally fixed transfers.<sup>30</sup> Immense distortions could arise in the context of taxation of nominal profits and interest payments. For example, households' income from interest payments is taxed at 25 per cent in Austria. So a 3 per cent interest rate with 2 per cent inflation would mean a net real return of 0.25 per cent (and tax payments of 0.75 per cent) while a 7 per cent interest rate with 6 per cent inflation would mean the same before-tax real return of 1 per cent while the net real return would be -0.75 per cent (with tax payments of 1.75 per cent).<sup>31</sup>

#### 2.3.4 A very attractive no-go: consolidating via bracket creep

The non-neutrality of tax systems to inflation (and nominal GDP growth) is also an important issue when making long-run projections of public finances. While in a balanced-growth path proportional taxes like VAT or corporate income tax should in principle grow at the same rate as GDP without any policy change,<sup>32</sup> this is not true for excise duties, nominally fixed transfers and the personal income tax.

In the current OeNB forecast, the elasticity of the income tax paid by employees on the average wage rate is 1.8 and the elasticity for pensioners is even 2.<sup>33</sup> So not adjusting the brackets for growth of average wages and pensions (or not even for inflation) would increase revenue substantially. As Table 2 shows, we expect the income tax of employees to make up about 5.8 per cent of GDP in 2010 and income tax receipts of pensioners 1.7 per cent. Assuming no change in brackets until 2020, nominal GDP growth of 4 per cent per year (in line with the macroeconomic scenario from above), a development of pension payments and employment as in the Ageing report, and nominal growth of average wages of 3 per cent, these numbers would increase to 6.5 and 2.4 per cent, respectively. This would imply a rise in the ratio of income tax over GDP by 1.4 percentage points, despite an assumed decrease in the wage share in GDP. Furthermore, while gross public pension payments would increase stronger than GDP over this horizon (see Table 1), the ratio of net pension payments over GDP would actually decrease.

In our simulation we assume that there are no behavioral changes; however, negative effects on labor supply are very likely to be a by-product of such a policy. The tax burden on labor significantly increased over the last decades. Thus, given the already very high burden on this production factor (see Section 2.2.1), raising taxes should be considered a NO-GO. However, a

<sup>30</sup> In their recommendation of raising inflation targets, Blanchard *et al.* (2010) also say that tax systems are often not designed for high inflation.

<sup>31</sup> Additional indirect effects of higher inflation could arise via a lagged response of (parts of) the expenditure side. However, they should be negligible as wages are likely to show a lagged response too and they are by far the most important tax base in Austria.

<sup>32</sup> To a very small extent, nominally fixed categories are also relevant for VAT (the revenue threshold above which companies are subject to VAT is nominally fixed) and corporate income tax (there is a nominally fixed minimum tax payment which has to be made every year regardless of profits); but the effects of non-indexation of these brackets is negligible.

<sup>33</sup> The OECD (2008) analyzes the extent of bracket creep in overall wage taxation in different OECD economies. Comparing these numbers with updated figures for Austria (the 2005 tax reform strongly increased the degree of progressivity in the Austrian income tax system; see Breuss *et al.*, 2004) indicates that the potential for consolidation via bracket creep in wage taxation is similar to the OECD average.

Table 2

**Mediu-term Effects of Bracket Creep**  
(percent of GDP)

	2010	2020	Difference
Income tax of employees	5.8	6.5	0.8
<i>Memo: Compensation of employees</i>	49.9	46.0	
Income tax of pensioners	1.7	2.4	0.7
<i>Memo: Gross pensions (Ageing Report 2009)</i>	12.7	13.0	
<b>Overall</b>	<b>7.5</b>	<b>9.0</b>	<b>1.4</b>

Source: OeNB.

decrease in income tax brackets in the next few years is very unlikely and the most recent tax reforms (2000, 2005, 2009) compensated only for part of the previously incurred bracket creep.

On the expenditure side, part of the transfer payments is also nominally fixed. Among monetary transfers, family related transfers play a special role in fiscal projections for the next decade(s): In 2010, they are projected to make up around 2 per cent of GDP. Looking at the demographic assumptions in EPC, the number of eligible people<sup>34</sup> will decrease by about 10 per cent until 2020. So even if these transfer payments are indexed to prices (but not to real growth), their share in GDP would decrease to around 1.5 per cent in 2020. The fiscal space created by these demographic changes could be used to increase transfers in kind to families (see Section 2.2.1).

### 3 Conclusions

A permanent loss in potential output following the crisis and the permanent nature of many discretionary stimulus measures have created a need for adjustment that goes significantly beyond the need to finance the economic stimulus packages *ex post*. The repercussions of the crisis on public finances are going to be exacerbated in the medium term also by the implications of demographic change.

In view of the anticipated negative effects on the real economy and in order to prevent free-riding behavior, policymakers should coordinate their measures internationally (and are, indeed, obliged to do so within the EU by the Stability and Growth Pact). While determined action is required to implement the necessary considerable fiscal adjustment, policymakers must at the same time proceed with sufficient caution so as not to jeopardize the as yet fragile recovery. Nevertheless governments would be well advised to develop credible consolidation programs rather soon, in order to ensure rapid implementation during the next recovery stage and in order to secure public confidence in the sustainability of public finances. Consolidation should focus on spending cuts, while avoiding conflicts with other economic policy goals (e.g., in the research and education areas). Any revenue-side measures should dampen growth as little as possible, which would speak for an increase in specific excise taxes and in taxes on immovable property.

These measures should be supported by structural reforms raising potential output (and thereby increasing tax revenue) like measures to increase the average retirement age.

<sup>34</sup> Most of these transfers are for children who are underaged and/or in professional education (including tertiary education).

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# THE FIRST TIME YOU NEVER FORGET: THE SUCCESS OF BRAZIL IN THE 2009 CRISIS AND THE NEED FOR THIRD-GENERATION REFORMS

Joaquim Vieira Levy\*

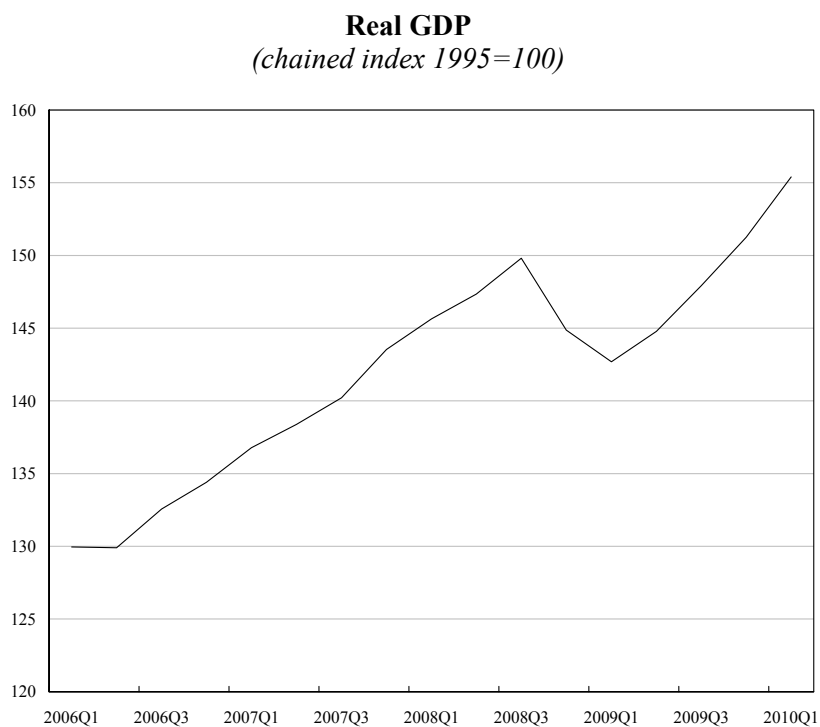
*Understanding how Brazil successfully faced the 2009 global crisis is interesting because the country is currently the 10<sup>th</sup> largest economy in the world and should climb new positions in that ranking in the years ahead. The recession lasted only two quarters in Brazil, followed by the creation of a million new jobs in 2009 and the expectation of 7 per cent GDP growth in 2010. For the first time in many years, instead of getting pneumonia when the rest of the world got a cold, Brazil fared better than most countries. This paper argues that this was the result of many years of accumulating strength through fiscal discipline and structural reforms, together with special features of the present crisis. The text, written from a practitioner stand point, summarizes the response of the Brazilian government to the crisis, highlighting factors that may help explain its success and the risks ahead. It also reviews options to leverage structural factors favoring growth in the coming years and the much yearned reduction in interest rates. It argues that priority should be given to keep fiscal responsibility and promote third-generation reforms to, inter alia, better use the excellent financial infrastructure that already exists in Brazil to fund much needed investments.*

## 1 Introduction

### **The impact of the 2008 financial crisis was short-lived in Brazil.**

As several developing economies continued to grow well after the US economy started to cool down in 2007. That apparent decoupling with the US and Europe resumed after a quick contraction following the failure of Lehman Brothers. GDP dropped 1.9 per cent in each quarter in early 2009, but seasonally-adjusted activity had overcome the peak of 2008 by the end of 2009, resulting in –0.2 per cent change in average GDP that year and expected growth in 2010 above 7 per cent (Figure 1). The two-quarter recession in 2009 followed 21 quarters of uninterrupted growth and was the shortest cycle in the last 30 years, although also the deepest.

**Figure 1**



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Table 1

**Labor Turnover at the Formal Market in 2009**

Branch	Admissions	Dismissions	Net	Percent of Change
Farming	1,270,867	1,286,236	-15,369	-0.99
Mining	42,915	40,879	2,036	1.18
Industry	3,147,085	3,136,220	10,865	0.15
Utilities	77,608	72,624	4,984	1.41
Construction	1,950,078	1,772,893	177,185	9.17
Commerce	3,783,528	3,486,371	297,157	4.20
Services	5,802,755	5,302,578	500,177	3.93
Public sector	112,804	94,729	18,075	2.33
Total	16,187,640	15,192,530	995,110	3.11

Source: CAGED – Ministry of Labor.

**Almost one million new formal jobs were created in the twelve months to December 2009.** Job creation was positive in all sectors except for farming. Also the informal sector accompanied the formal market, further brightening the labor market (Table 1). Job creation in 2010 is likely to exceed 2 million positions.

**Understanding how Brazil overcame the crisis so quickly is interesting because Brazil is already the 10<sup>th</sup> largest economy and may become the 5<sup>th</sup> largest in the next few years.** The economy was much more resilient this time than in any previous occasion in the last 25 years, and the government had instruments to react to the crisis. Therefore, as soon as it became evident that the world economic meltdown had been averted by vigorous government intervention in developed countries, the Brazilian economy reacted, also helped by confidence from foreign investors. This was translated into an economic boom, with the acceleration of infrastructure investment, and evidence that emerging markets could make a contribution to the world economic recovery.

**The response of the government, made possible by the strengthening of the economy in recent years, provides a useful background to the discussion of priorities for the upcoming period.** Government response, although timely and effective, implied an increased exposure of the public sector to the balance sheet of companies and was accompanied by a deterioration of the external current account balance. The impact of these risks is still limited and mitigated by several factors, such as the new oil province announced in 2008 that will provide long-term support to Brazilian exports. These favorable factors do not overshadow, however, the need for further structural reforms, especially to attain the goal of reducing distortions that still keep interest rates at high levels, and to allow the private sector to grow with less support from government. The following sections of this text review the reforms undertaken in the last 15 years and the economic standing of the Brazilian economy before the crisis, as well as the response of the government to the crisis, to sketch a balance of risks ahead and policy options to help attain the objectives above.



## 2 Initial conditions

### 2.1 The 1990s

**Brazil has experienced important changes in the last twenty years.** These changes were spearheaded by the opening of the economy in 1990, in the wake of the fall of the Berlin Wall. Because inflation of more than 1000 per cent made impossible for Brazil to be competitive in a global economy, that opening forced the government to face the problem of chronic inflation, which had worsened in the 1980s. For this purpose, a clever mechanism was implemented in 1994 to stop inflation protecting the economic value of existing contracts. The underlying conditions to this transformation were a fiscal contraction in 1993-94 and increased access to external savings in 1995-97. The end of inflation also forced the consolidation of the financial sector and spurred a modern and comprehensive financial regulation, higher bank capitalization, and enhanced supervision.

**Globalization helped anchor the new currency during the mid 1990s and finance long overdue investments, notably in infrastructure.** In this environment, profound changes in the business sector, now facing full fledged foreign competition, fostered an increase in overall productivity. Tight monetary police, on the other hand, stimulated the maintenance of low leverage ratios, helping insulate companies from international crises.

**Low inflation, however, posed a fiscal challenge.** The loss of the inflation tax, combined with wage increases granted in the last months of high inflation proved a heavy burden to state governments and the federal government, and herald a few years of fiscal relaxation. The persistence of high interest rates, reflecting a lingering distrust about fiscal sustainability and the overall macroeconomic balance, further punished public accounts. As a consequence, the public sector was vulnerable to the Asian crisis, and particularly to the events following the failure of LTCM and events related to the Russian debt in 1998. Increased risk aversion by international investors rendered difficult to keep the pegging of the *real*. The strategy of trying to stem capital outflows through higher domestic interest rates quickly showed its limitations, stressed the fiscal outlook and ultimately led to the breakdown of the exchange rate system in early 1999.

**The response of Brazil to the 1998 crisis was a new macroeconomic framework based on a flexible exchange rate, inflation targeting, and fiscal responsibility.** Of these, the most difficult to achieve, as well as the most important, was a long overdue commitment to fiscal discipline. The new framework was introduced amid an unfavorable international environment, and against the initial skepticism of the International Monetary Fund, but has been long-lived and successful.

### 2.2 The 2000s

**Fiscal discipline was quickly translated into the Fiscal Responsibility Law voted in 2000.** The law provided an encompassing framework, applicable to the federal, state and local government. The Fiscal Responsibility Law-LRF, in addition to introduce sharp constraints on the financing of the public sector, including state-controlled financial institutions, provided for budgetary planning and disclosure rules. A hallmark of the LRF is the bi-monthly review of fiscal targets and budget execution, which drastically reduces the chance of large slippages. The law also rendered unlawful the bailing out of states by the federal government. It provided for limits to public debt, which reinforced those set in refinancing programs signed by the federal government and states in the late 1990s. A comprehensive and swiping electronic system was built to check the compliance of government to obligations, halting voluntary transfers when rules are not observed. Importantly, fiscal dominance was reduced by the focus on primary fiscal targets, rather than on nominal fiscal

Table 2

**Federal External Debt in 2008**  
(million US\$ equivalent)

Maturity	Dollar	Euro	Real	Other	Total	Share
in 12 months	4,025.76	855.67	552.27	133.08	5,566.77	5.78%
in 24 months	9,262.84	1,882.36	1,104.53	221.79	12,471.52	12.95%
in 36 months	14,997.21	2,762.82	1,944.26	286.04	19,990.32	20.75%
in 48 months	19,749.91	3,492.55	2,640.23	339.28	26,221.97	27.22%
in 60 months	24,732.04	4,257.52	3,369.80	395.10	32,754.45	34.01%
beyond 5 years	48,480.20	7,443.70	7,099.29	543.14	63,566.33	65.99%
Total	73,212.24	11,701.21	10,469.09	938.24	96,320.78	100.00%

targets. This choice helped improve overall fiscal planning and relieved the pressure on monetary policy, strengthening its ability to deliver the inflation targets.

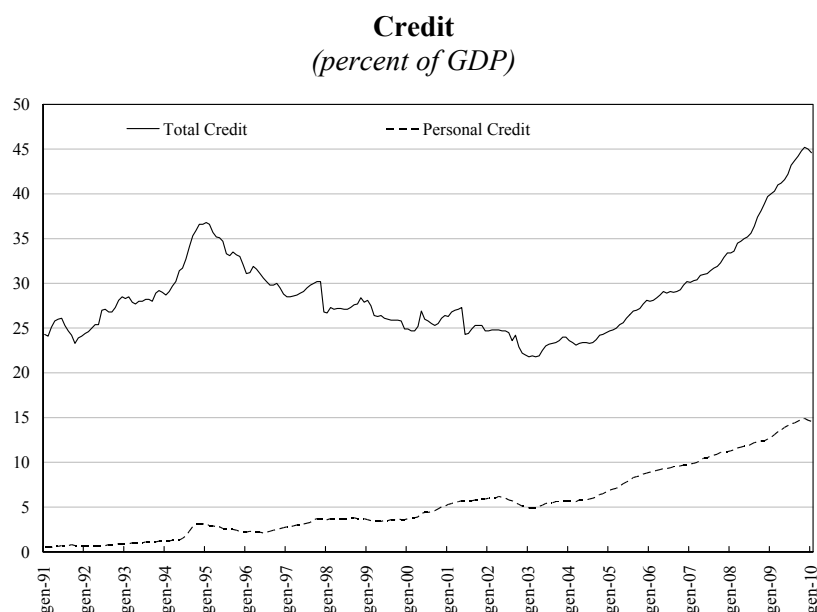
**Fiscal targets were met every year to 2009.** Moreover, in the wake of the election of President Lula, the target for the consolidated public primary surplus was raised to 4.5 per cent of GDP, a value observed in the following years. Unfortunately, the brunt of the fiscal adjustment fell on tax increases, owing to the rigidity of pensions and health care, as well as of public wages. As a consequence, the tax-to-GDP ratio for the consolidated public sector rose from around 25 per cent in the early 1990s, to around 35 per cent by the mid of the 2000s.

**Improvements in the fiscal stance helped change the profile of public foreign debt after 2003.** Old, expensive Brady bonds issued in the 1990s were replaced by cheaper and longer-term global issues; for the first time ever *real*-denominated bonds were issued abroad, as a way to familiarize a new class of investor to the local currency and eventually to local bonds. In 2005, all IMF loans were repaid in advance, the same happening to Paris Club loans, some of which dating back from the 1980s. The stock of foreign public debt was lengthened, with 2/3 of maturities beyond five years, and had dropped to US\$ 96 billion by 2008 (Table 2). These improvements were translated into a much belated upgrade of the foreign federal debt to “investment grade” in 2008.

**The floating exchange rate, together with the worldwide dynamism of international trade, spurred Brazilian exports.** Since 2000, the diversification of products as well as of destinations of Brazilian exports has been remarkable, with manufactures reaching an increasing large array of partner countries. Brazilian companies also expanded abroad, with acquisitions and contract awards in all continents. As a result, Brazilian exports jumped from about US\$ 50 billion in 2000 to close to US\$ 200 billion in 2008. Between 2004 and 2007, Brazil also ran a small current account surplus, allowing the Central Bank to accumulate reserves on a more solid fashion than in the 1990s.

**Improvement in the fiscal and external balances promoted confidence and GDP growth.** After a major turbulence ahead of President Lula election in 2002, a long period of growth took hold, further buttressed by the President’s steadfast support of the Central Bank. After almost two decades, average growth was back in excess of 4 per cent, notwithstanding the forceful response of the Central Bank anytime high growth (e.g., 5.7 per cent in 2004) started to build inflation

Figure 2



pressures. The improvement in the denominator of the debt/GDP ratio reinforced the contribution of the real appreciation and of interest rates, to reduce this ratio by almost 10 percentage points in 2003-08.

**Growth was accompanied by more domestic credit.** While the domestic credit/GDP ratio had dropped from 35 in 1995 to 22 per cent in 2002, it showed a steady increase in the following years, rising from 23.5 in 2004 to 37 per cent by late 2008 (Figure 2). That growth was due mostly to private

banks, in the wake of lower spreads and reforms that yielded stronger guarantees and liens over paychecks, cars and residences.

**Credit and jobs helped create a new middle class.** Poverty reduction, which improved significantly after the stabilization of the currency in 1994, was accelerated after 2005. Although the Gini coefficient remains high at 0.57, strong job creation, as well as transfer programs such as the Bolsa Família that benefits 12 million households, have contributed to reduce the number of very poor households (income below R\$ 804) by 40 per cent since 2002 (Figure 3). Meanwhile, the share of the middle class, *i.e.*, households earning between R\$ 1,150 and R\$ 4,800 a month (US\$ 8,500-32,500 a year), in the population has risen by more than 10 percentage points. Together with the upper classes, it accounts now for 70 per cent of households, from 53 per cent in 2003.<sup>1</sup> The impact of income growth on consumption has been further fueled by more personal credit, especially paycheck loans, with strong reflex on the consumption of services and durable goods.

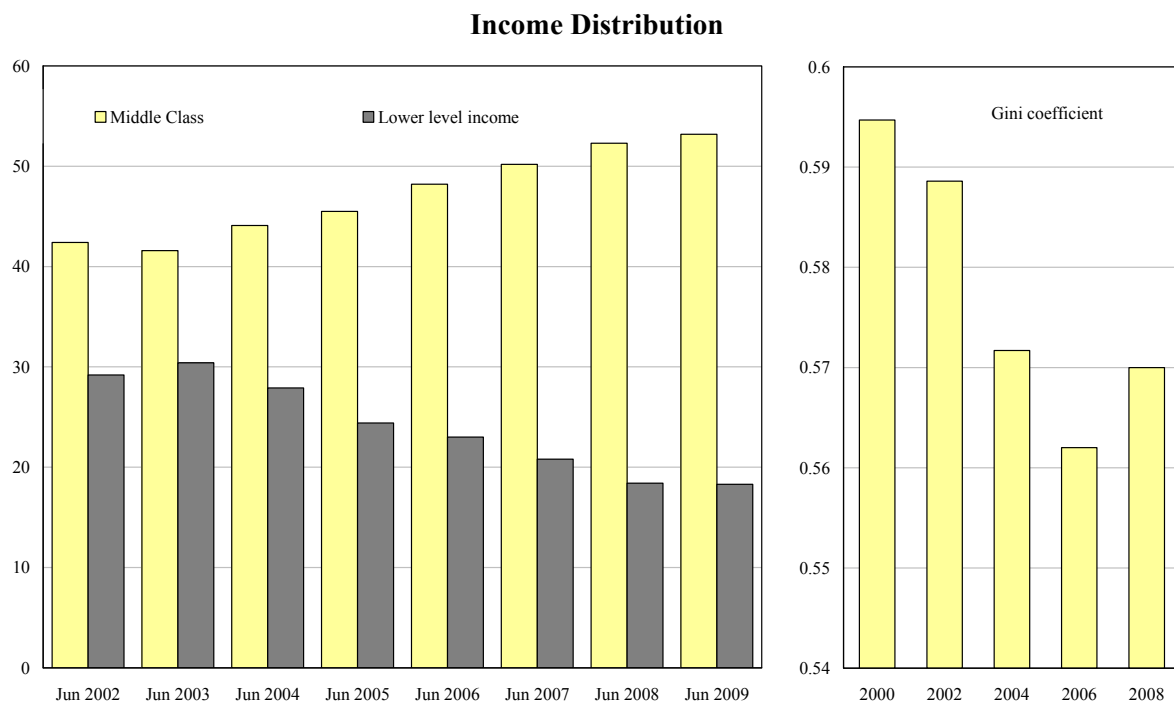
**In sum, in mid 2008 Brazil enjoyed a growing economy, with a comfortable external balance, a much improved fiscal situation, and a watchful Central Bank.** The country also experienced a surge in investment, reflected in a record number of IPOs. Fortunately, all these indicators, including credit, were still in a beginning-of-a-cycle position when the crisis hit.

### 3 The crisis and the government response

**The credit crunch and drop in commodity prices that are typically caused by financial crises was very brief in the aftermath of the failure of Lehman Brothers.** The crisis initiated in 2008 was different from the ordinary global shock, because of the response of authorities in developed countries and China. This time around, there was a massive injection of liquidity by the central banks of developed countries and China helped keep world demand afloat by embarking in a

<sup>1</sup> Ranking established by the Center for Social Policies at Fundação Getúlio Vargas.

Figure 3



massive public works program. Both features created a favorable environment to Brazil. Together with the soundness of the Brazilian financial market and the Central Bank ability to respond to circumstances without wavering in its commitment to the floating exchange rate, this environment helped business people to quickly recover confidence and the government to use the fiscal room it had build, without jolting financial markets. In the occasion, the Central Bank also reinforced its vast international reserves with contingent lines with the US FED (US\$ 30 billion) and the IMF. None of these lines were however used.

**The government response to the global slowdown can be grouped into protection of financial markets and support to credit; full use of automatic stabilizers; and outright fiscal stimulus.** The Central Bank played a paramount role in implementing the first group, while policies already in place responded for most of the second, and a mix of tax brakes, public-sector wage increases, and a pro-active stance of public banks accounted for the third. The ability of the country in successfully deploying theses tools, rather than their originality, was perhaps the big news about them.

### 3.1 Protection of financial markets

**The Central Bank ensured the smooth operation of currency markets.** This was based on more than US\$ 200 billion in international reserves, and the judicious swap of part of them with domestic players. Central Bank interventions included US\$ 24 billion in credit to exporters, outright sales of US\$ 14.5 billion and swaps adding to US\$ 33 billion (Table 3). This strategy was predicated on the view that the external sector was fundamentally sound, and those who had borrowed from the Central Bank would be able to repay it in a few months. The provision of liquidity ensured that exports continued to flow, and that futures markets would not face undue turbulence; also the Central Bank could earn some income by selling dollars when the *real* was

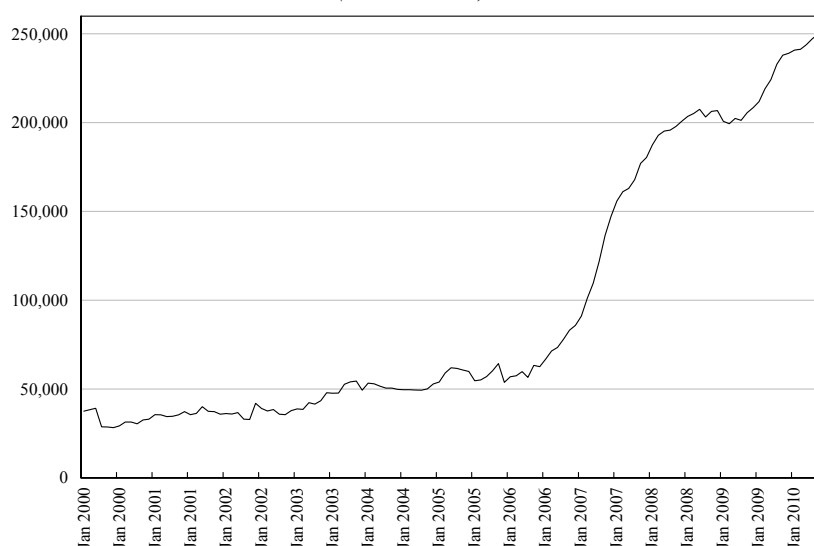
Table 3

**Interventions of the Central Bank in Late 2008  
and Accumulation of Reserves to July 30, 2009**  
(US\$ billion)

Item	Sales	Repayments	Balance
Spot	14.5	8.2	6.3
Export financing + repos	24.5	20.0	4.5
Total	39.5	28.2	10.8

Figure 4

**International Reserves**  
(US\$ billion)



depreciated, buying them back when the currency recovered. The bet proved right. The *real* recovered quickly from the 40 per cent fall experienced in late 2008, and stabilized around R\$1.8/US\$ (*i.e.*, around the exchange rate in 2000). In a few months, international reserves were higher than at the outset of the crisis (Figure 4). By mid 2009, US\$ 20 billion of the export credit lines and US\$ 8.2 billion of the outright sales, as well as US\$ 11 of the currency swaps had been repaid. Almost all the resources had been paid back by 2010.

**Ensuring liquidity in the immediate aftermath of Lehman's collapse was essential to avert an unnecessary crisis.** In 2005-08, Brazilian companies had lengthened their debt through international bond issues. Nonetheless, in addition to the need of rolling over that debt, external

bank credit still accounted for about US\$ 97 billion in September 2008, and US\$ 47 billion in domestic bank credit were supported by foreign lines. These funds amounted to 20 per cent of the total bank credit market, and the contraction of foreign credit made domestic lending based on foreign funds drop by US\$ 38 billion between September 2008 and January 2009. Also, as international capital markets froze, Brazilian companies turned to domestic banks. The most striking case of this dislocation was the R\$ 2 billion emergency loan granted by the federal savings bank to Petrobras. A result of this short run financial drying out was a sharp contraction of output in late 2008, as companies cut inventory and put workers on vacation.

**The Central Bank channeled liquidity to small banks.** In Brazil, small banks depend on funds from large banks, rather than the other way around, as traditionally in the US. As a consequence, they were squeezed when large corporations started to compete for funds from large banks. That had an immediate effect on medium-size companies, which are big employers and depended on smaller banks. In response, the Central Bank reduced reserve requirements by 40 per cent in October 2008, freeing R\$ 100 million (3 per cent of GDP, since requirements amounted to 1/3 of

total credit). About half of that was earmarked to re-lending by large banks to small banks or other ways to disperse credit. This re-lending could be insured at government subsidized rates. Most of the remaining freed resources were, however, mopped up by the Central Bank, since private banks did not expand their overall credit in the following months. With the recovery of the economy, requirements were jacked up in early 2010 in the wake of a brisk increase in credit.

**Helping smaller banks also supported personal credit.** In late 2008, President Lula made a carefully balanced speech on TV prompting workers to continue to spend, except if they already carried large debts. His message was that, as long as a worker did not face a debt overhang, he or she would be better off spending, because this would ultimately help preserve his or her job. Smaller banks were specialized in personal credit, and the intervention of the Central Bank protected this market, which was further stimulated by the entrance of public banks in that segment in the following months.

**Although the Central Bank does not make much publicity about**

Figure 5

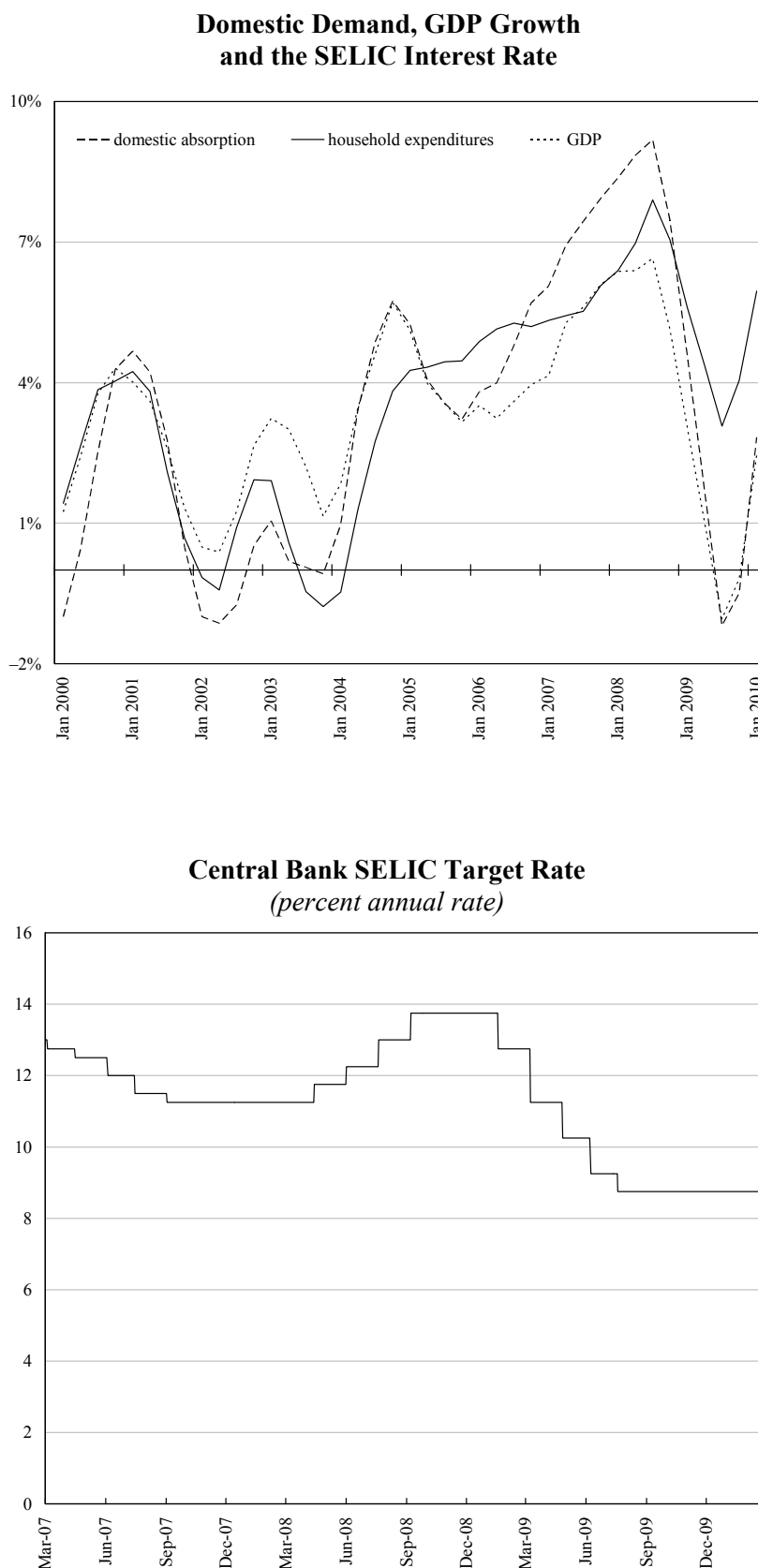
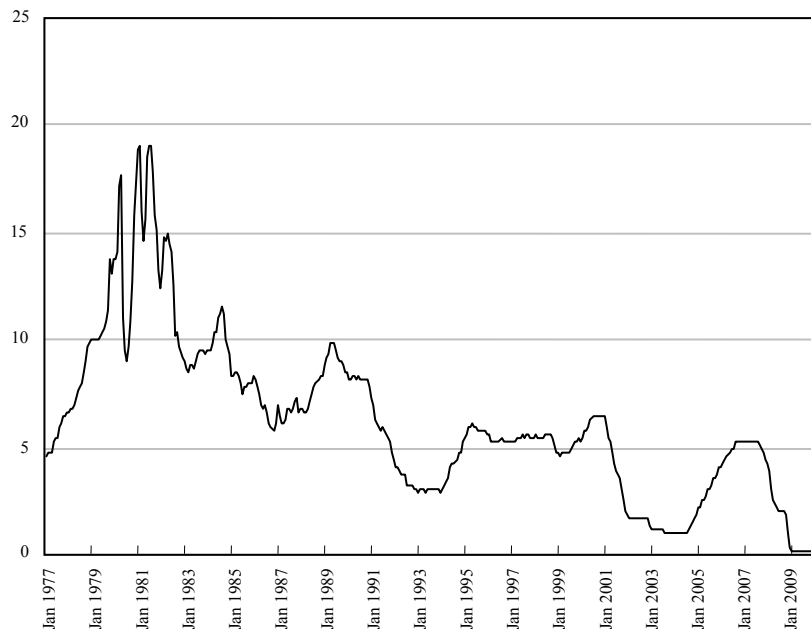


Figure 6

**Federal Funds**  
(percent year)



its role in supporting aggregate demand, interest rates fell to their lowest levels in 15 years. Rates had actually been tightened in 2008, to respond to the impact of record levels of international commodity prices and the overheating of the economy, which was growing at 6 per cent y-o-y, fueled by domestic demand growth of 9 per cent y-o-y (Figure 5). Between April and September 2008 the Central Bank SELIC rate rose from 11.25 to 13.75 per cent. Rates started to decline only in January 2009, after GDP had contracted close to 2 per cent and inflation

expectations were tamed. The SELIC had dropped to 8.75 per cent by July 2009, when the relaxation cycle was complete. It was the first time in recent years that Brazil was able to respond to a slowdown in the world economy by relaxing rather than tightening monetary policy.

**The Central Bank was comfortable to reduce rates because of the equilibrium in the domestic economy and the policy response of developed countries to the crisis.** The very accommodative monetary policy in the United States created unusual liquidity in world markets, stimulating capital flows to Brazil and helping support the exchange rate and reduce inflationary pressure. This is, of course, a scenario radically different from those faced by Brazil in the 1980s, in 1995 (the so-called “Tequila crisis”) or in 1998-2001, when capital outflows were the norm, often in the wake of a tightening in the US (Figure 6). It allowed the public sector to adopt a much more ambitious response than in previous crises.

**A proactive role for the public sector was illustrated early on by the response to the problems of a handful of exporters caught off guard.** As mentioned above, financial markets performed well during the crisis. Nonetheless, there were a few companies that faced very dangerous situations. In particular, two large exporters that had been unhappy with the appreciation trend of the *real* and high domestic interest rates, bought complex derivatives, betting on borrowing at lower interest rates against the risk of a large loss in the case of a major depreciation of the *real*. As the currency swung beyond any expected threshold, the contracts called for extremely punitive payments that exceeded by far the companies’ export streams and caused severe cash flow problems. The government response, after checking that this was an idiosyncratic problem, was to induce each of the firms to merge with stronger competitors, with the financial help of the National Bank for Social and Economic Development (BNDES). The strategy chastised controlling shareholders, while striving to preserve ongoing concerns. It was perceived as a portent of opportunities opened by the crisis, for allowing the creation of global powerhouses in the export markets of poultry and cellulose.

**The episode of derivatives also highlights strengths of Brazilian financial markets.** Authorities could intervene firmly and timely because they had access to information, which included the individual name of final risk bearers of each contract. By inquiring in the clearing system (CETIP) where it is mandatory to register every over the counter contract, the Securities Exchange Commission (CVM) and the Central Bank were able to quickly map the exposure of all domestic derivatives. This stands in striking contrast with, for instance, the US, where authorities would know only the aggregate positions of banks. The review showed Brazilian authorities that large risks were concentrated on exposures of one type of contract offered by foreign banks offshore, facilitating the tailoring of the response. Also, because most companies knew that the Central Bank would not try to defend the currency, they were adequately hedged, requiring minimum liquidity provision to the futures market by the Central Bank.

### 3.2 *Automatic stabilizers*

**In contrast with most developing countries, Brazil has strong demand stabilizers, anchored on sizeable social transfers.** Pay-as-you-go pension payments amount to 9.2 per cent of GDP. About 40 million workers, in a 92 million working force contribute to the general pension system, while 6.5 million are enrolled in schemes for public employees, and 19 million are self employed in and out of the formal market and the roll of social security contributors. The general scheme pays about 23.5 million benefits a month, of which 1/3 referring to rural pensions with tenuous contributory factor. In addition, the social security pays 3.5 million old-age and disability minimum-revenue benefits (LOAS-RMV) amounting to R\$ 20 billion. Unemployment insurance, although limited by high rotation and job informality, typically benefits more than 6 million people a year. Also, since the early 2000s, and especially since 2003, the Bolsa Família program has become an important vector for social transfers (before 2003 the program had a different name). By 2008, it reached more than 11 million households (close to 20 per cent of the Brazilian population) with benefits averaging R\$ 1000 a year (US\$ 50 a month).

**All mechanisms of social transfers expanded their payments in 2009, translating into a stimulus of 0.45 per cent of GDP.** Social security outlays rose from R\$ 199 billion in 2008, to R\$ 225 billion (US\$ 125 billion) in 2009. This 13 per cent increase was well above inflation or the growth of nominal GDP, reflecting the upward trend in the number of beneficiaries and real increase in benefits linked to the minimum wage. LOAS/RMV outlays increased by 18 per cent (0.07 per cent of GDP), while unemployment insurance payments rose from R\$ 21 billion (0.70 per cent of GDP) to R\$ 27 billion (0.88 per cent of GDP), with the roll of beneficiaries rising to 7.5 million. On September 2009, the scale of Bolsa Família benefits was increased by 10 per cent, compounding the effect of the expansion of the coverage of the system to 12.4 households. Total expenditure with the program reached R\$ 12 billion in 2009, or 0.3 per cent of GDP.

**A recent minimum wage setting mechanism helped support demand.** The rule agreed in 2007 established that real wage increases should reflect per capita real GDP growth two years before. Confirmed by the decree n. 456/2009, it meant more than 5 per cent real growth for the minimum wage in 2009. The impact of this growth went well beyond formal employees earning the minimum wage for two reasons: pay levels in the informal market are linked to the minimum wage, because the duality of labor markets is related more to the payment of taxes than to wage levels; the floor of pensions and other benefits, comprised in the “broad labor compensation” monitored by the Central Bank, are also linked to it.<sup>2</sup>

<sup>2</sup> For the Central Bank, “wage” income accounts for 76 per cent of broad labor compensation, while pensions represent 21 per cent and minimum income programs 3 per cent.



### 3.3 Fiscal measures

**Fiscal measures by the central government included reductions in taxes and increases in public servant wages and investment.** Tax breaks ranged from the reduction in the federal VAT on industrial goods (IPI), to the introduction of new income tax brackets aimed at reducing the tax burden on the middle class. Also, the tax on the financial transaction IOF on loans and the corporate income tax due by companies involved with a new low-income housing program were cut down. Altogether, the direct fiscal stimulus amounted to about 0.5 per cent of GDP, with the following breakdown: R\$ 5 billion (0.2 per cent of GDP) due to the change in income tax brackets; R\$ 6 billion out of total IPI revenues of R\$ 39 billion in 2008; R\$ 2.5 billion related to IOF; R\$ 0.2 billion related to the tax break for the real estate sector. The stimulus was effective in some sectors, such as the auto industry and home appliances: car production recovered to a record level of 3.1 million vehicles in 2009, making Brazil the fifth largest auto producer in the world that year.

**The increase in public wages outpaced by far the expansion in public investment.** Wages in the Executive branch rose by 16 per cent in the Executive branch. Together with an increase in positions, it led the payroll to rise from 4.35 per cent of GDP in 2008 to 4.84 per cent of GDP in 2009. This 0.5 per cent of GDP increase was larger than the combined effect of automatic stabilizers, although it benefited a much smaller group of people. It was also larger than the R\$ 11 billion expansion in Central Government investments, notwithstanding the prominence given to projects in the PAC-Growth Accelerating investment program, especially those benefiting from the PPI allowance that excluded certain Central Government investments from the primary target (PPI outlays increased from R\$ 7.8 billion to R\$ 16 billion).<sup>3</sup> Indeed, despite great managerial effort and absence of fiscal constraints in the case of the PPI, investments by the Central Government amounted to just a bit more than 1.5 per cent of GDP in 2009.

**Significant part of the fiscal stimulus was done through public enterprises.** Public investments by Eletrobras, the federal electricity holding company, reached R\$ 3.6 billion, while the company, often as a minority partner, participates in PAC projects to the top of R\$ 41 billion. Petrobras invested R\$ 50 billion in the first three quarters of 2009 (1.6 per cent of annual GDP), as part of its US\$ 174 billion investment plan for 2009-13. Investment by the federal government and Petrobras accounts for more than 15 per cent of total investment, according with the Ministry of Finance. However, despite its role in the PAC and in the government public agenda, Petrobras has recently been excluded from the fiscal figures of the consolidated public sector, because Brazil adopted the practice used in most developed countries with regard to public enterprises producing market goods. Traditionally, Petrobras contribution to the consolidated public sector primary balance had been in the range of 0.4-0.5 per cent of GDP.

**Additional stimulus came from public banks through vigorous credit expansion** (Figure 7). Banco do Brasil moved aggressively in retail, in addition to keep its traditional role in farming. It acquired two medium-size banks, one in a rescue operation and the other put for sale by a state government. Banco do Brasil took full advantage of lower interest rates and the acquisitions to increase its consolidated lending by 33 per cent in 2009. The savings bank Caixa Econômica Federal (CEF) expanded its credit by more than 50 per cent, increasing its market share by 2.3 percentage points to 8.8 per cent, in a expanding market. The balance sheet of BNDES more than doubled *vis-à-vis* 2007, with large exposures to private and public companies, in support of outright investments as well as several mergers and acquisitions. Disbursements totaled R\$136

<sup>3</sup> The PPI was introduced in 2005 as a pilot project in which investments with ascertained rates of return would be excluded from the fiscal targets under the argument that the country was not facing a liquidity constraint anymore and therefore fiscal targets should focus on solvency. As such, if an investment could bring more in the long run than the cost of financing it, it was worth doing as long as this financing were available. At the beginning the PPI allowance amounted to R\$ 3 billion a year, with the possibility of replacing projects that did not perform adequately with new ones.

billion in 2009 (≈US\$ 75 billion), against R\$91 billion in 2008 and R\$65 billion in 2007 (*i.e.*, +2 per cent of GDP). With credit expansion by private banks modest for most of 2009, the share of public banks in total credit rose from 34.8 per cent in late 2008 to 42 per cent by the end of 2009.

**Abundant credit also propped up a new housing program and helped buffer states against the decline in federal transfers.** The “*minha casa-minha vida*” low-income housing program was set up to provide R\$ 6 billion in subsidized loans to developers and households.

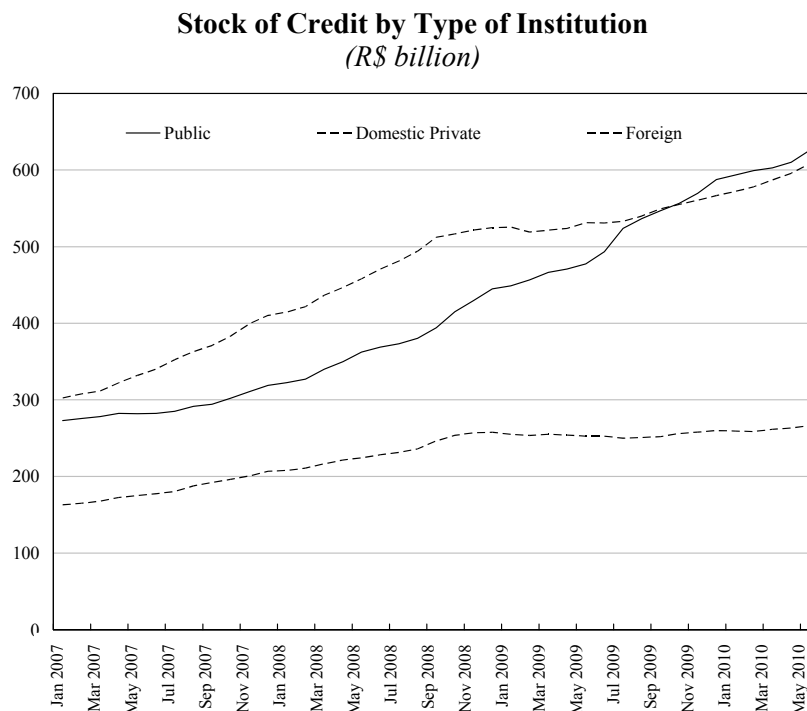
Although disbursements were negligible in 2009, projects for 275 thousand houses were approved, creating great expectations in the construction sector, which had not benefited from significant public funds since the 1980s, when macroeconomic instability led to the bankruptcy of the existing financing system (BNH).<sup>4</sup> The federal government also offered about R\$ 2 billion in loans from public banks to states facing shortfalls in VAT receipts and lower federal transfers, and lifted their borrowing ceilings by R\$ 10 billion, facilitating loans from multilateral financial institutions.

**On balance, the crisis strengthened the presence of public companies, which was already significant, especially in energy and banking.** Petrobras is dominant in domestic oil and gas production, virtually a monopolist in refining and an important player in fuel distribution. Its sales reached R\$ 232 billion in 2008, for a market cap of US\$ 97 billion (Total’s and Eni’s market caps were of US\$ 128 billion and US\$ 93 billion respectively, in December 2008). Sales of Eletrobras summed R\$ 32 billion in 2008. The company controls 38 per cent of electricity generation and 56 per cent of transmission, with more than 40 thousand miles of transmission lines. Banco do Brasil was the largest bank prior to the merger of Itau and Unibanco and its profits reached a record level of R\$ 10.1 billion in 2009 – the largest ever for any Brazilian bank. CEF is also among the largest five or six banks, but its profits fell by 22 per cent in 2009, while those of private banks rose on average by 24 per cent that year. BNDES annual lending nowadays exceeds by far that of the World Bank.

#### 4 Remaining risks and structural issues

**The success in responding to the crisis highlights the importance of fiscal issues in Brazil and**

Figure 7



<sup>4</sup> The resulting bad loans remained in the financial sector until 2001, when they were moved to the resolution company EMGEA.

**of further reforms to consolidate the gains obtained in the last 15 years.** The response brought fiscal risks that go beyond the decline in the primary surplus of the central government in 2009. These risks may be more related to the belief that the success of the fiscal stimulus and credit relaxation during the crisis vindicates a larger permanent role for the public sector, rather than being an evidence that years of effort allowed the country to successfully deploy countercyclical measures, which were supported by the exceptional combination of lax monetary policy in developed countries and sustained demand in China. Diverse perceptions of the meaning of the quick recovery can thus lead to different policy choices in coming years. These could favor demand stimulus and increased reliance on public companies as the way to long-term growth, or could keep the emphasis on promoting additional structural changes through institutions and the fostering of competition in a free-market economy. They will also be instrumental to reach the long yearned goal of lower interest rates. The decline in interest rates, if correctly done, could unleash a new wave of investments. If forced inappropriately, it could lead to capital flight and stagnation. The following paragraphs review the economic outlook and risks in Brazil, and suggest a direction for a new generation of reforms that may help achieve those goals safely.

#### *4.1 Economic outlook and risks*

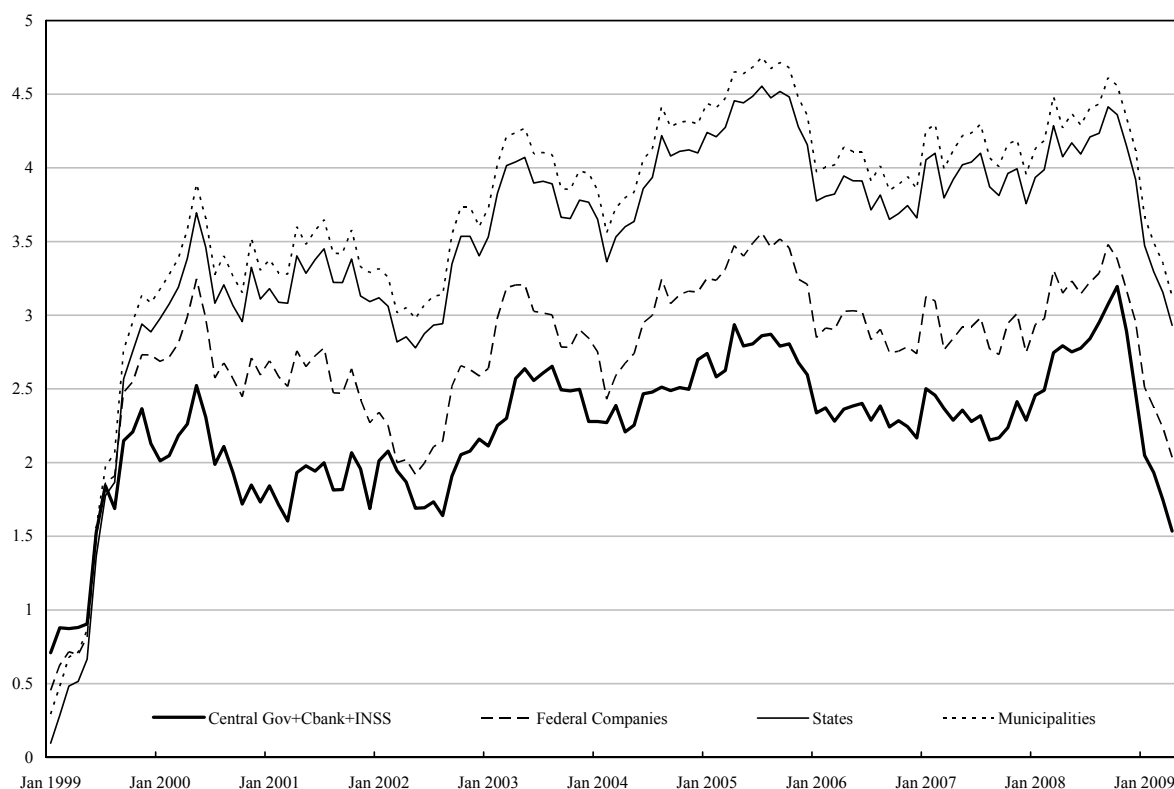
**The recovery was unmistakable by the end of 2009, and output is likely to be well beyond potential by end 2010.** Retail sales were 8.8 per cent higher at end 2009 *vis-à-vis* one year before; a few months later, industrial production had also regained the lost ground, pulled mostly by domestic demand. Industrial capacity utilization reached record level in 2010, while unemployment was 5 percentage points below its level at the beginning of the growth cycle in 2004, at around 7 per cent. Investment also started to pick up, reaching 19 per cent of GDP in early 2010. By the beginning of the year, the Central Bank started underscoring signs of inflationary pressures, leading to a 1.5 per cent increase in rates by mid 2010, with further tightening likely to be pursued, given the 9 per cent y-o-y GDP growth in the first quarter of the year, an average of up to 250,000 new jobs a month, and inflation in the service sector close to 10 per cent.

**Improvement in fiscal accounts in 2010 will be due mostly to the buoyancy of the economy, as in 2008.** The deterioration of the primary surplus in 2009 suggests an important break with early Lula years, even considering cyclical factors. Indeed, fiscal discipline begun to weaken before the crisis, although that was masked by the upswing of the economy. The phasing out of the CPMF contribution on bank transactions in December 2007 implied a permanent loss of R\$ 40 billion in revenues (1.5 per cent of GDP), which was temporally offset by the extraordinary buoyancy of the income tax in 2008, pushed by profits from banks and the general acceleration of GDP (the income tax rose 19 per cent from 2007 to 2008, accounting for R\$ 30 billion in additional revenue). With the economic slowdown, those weaknesses became apparent, and were compounded by a change in the command of the Revenue Service in August 2008 that brought ill-timed and ineffective innovations, which eventually led to the replacement of the team a year later. With the recovery, tax receipts have increased (sometimes with the help of once-off measures), improving fiscal outcomes. Nonetheless, primary results remain erratic, and expenditure remains the real problem. Central Government outlays, excluding transfers to sub-national governments, rose by 15 per cent in nominal terms in 2009 (+10 per cent real, or 2 percentage points of GDP), and Government and Congress have brought new decisions on pensions and public-sector wage increases in 2010 that only exacerbate the problem.

**It is important to continue to watch primary results and debt levels.** The primary surplus of the central government halved in 2009, dropping to 1.25 per cent of GDP (Figure 8). It may improve in 2010, but targets for 2011 include so many allowances for special items, that they are losing their meaning. Also, beyond Central Government primary spending, the expansion of the BNDES balance

Figure 8

**Primary Balance of the General Government**  
(percent of GDP)

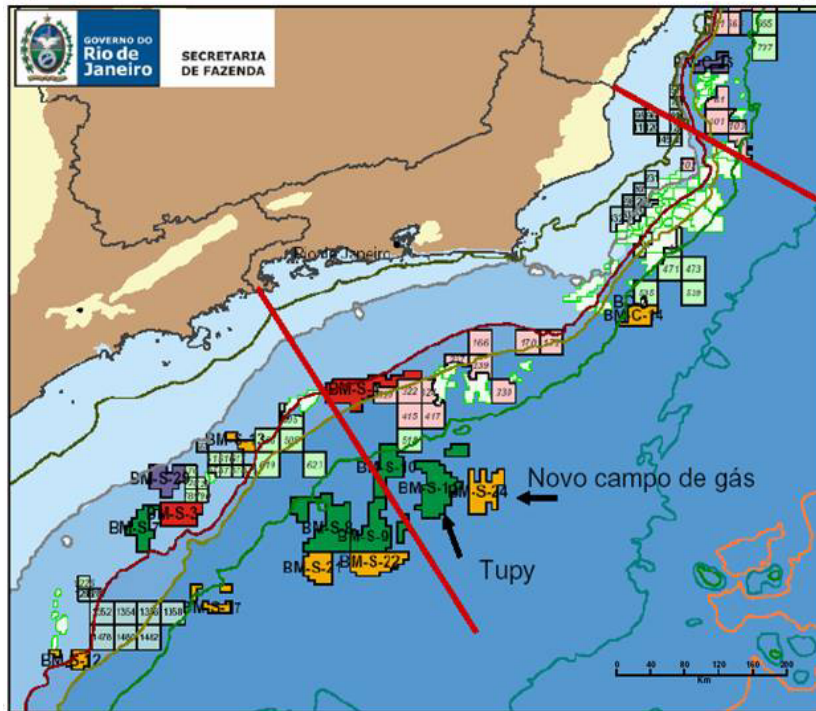


sheet raises flags: most constraints on lending to public companies imposed in the 1990s and early 2000s were lifted, while large exposures to private companies over a broad range of sectors were built. Abstracting from legitimate views on industrial policy, these actions have a clear fiscal bias, because they required extensive support from the National Treasury and brought back a practice of money-creation that had been stopped in the 1980s. Although the increase in the Treasury exposure did not affect the non-financial public sector net debt figures, because it was effected through the purchase of BNDES subordinated debt rather than outright capital injections, it impacted gross debt. Of the R\$ 233 billion increase in the National Treasury gross debt in 2009 (+15 per cent, or 5 per cent of GDP), R\$ 102 billion (3 per cent of GDP) arose from the financing of public banks.

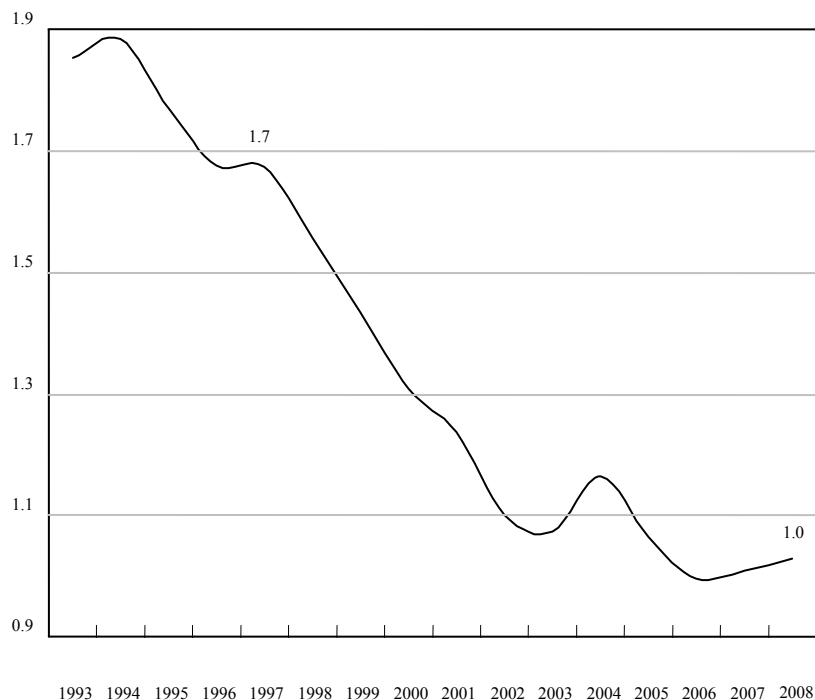
**Public spending will keep the pressure on the external accounts.** The strong pace of household consumption, fueled by fiscal and credit policies, as well as a sharp increase in profit and dividend remittances, has created a current account deficit. This increase appears to be related to financial needs of international companies rather than to any weakness in the Brazilian economy, as it has been contemporary to higher foreign direct investment inflows and reserves levels (the BOP showed a US\$ 46 billion surplus in 2009, with a financial account surplus of US\$ 70 billion). Nonetheless, risks may be accumulating, considering that imports have doubled in quantum since 2006, while the quantum of exports has remained stable. More than half of the increase in exports receipts in the last five years is owed to price increases, while import prices have been very tame. A change in the terms of trade, often contemporary with a global increase in interest rates, could require an important adjustment in the economy. Past experience and the dynamics of imports

Figure 9

### Energy Independence and the “Pré-sal” Oil Province Off-shore Rio de Janeiro



### Oil Consumption/Production



Source: ANP.

during the crisis suggest that this adjustment is feasible, if not painless. A large part of imports refers to intermediate goods, and their weight floats with the exchange rate and other relative prices, owing to the ability of the diversified domestic industrial basis to supply these items when prices are attractive. The increase in the import content of local manufacturing, as well as in the share of commodities in total exports, has not necessarily implied a hollowing of the Brazilian industry.

**On the bright side, Brazil can count on new oil discoveries and a steady demand from China.** Brazil can be a reliable long-term supplier of minerals, food, construction materials and basic industrial goods to China. With regard to oil, the reserves in the “pré-sal” province are in the 50-80 billion barrels range (Figure 9). Production there could reach 2 million barrels a day by 2017. Most of this oil would be available for exports, generating up to US\$ 50 billion a year in income (1-2 per cent of GDP). In addition, minimum domestic content requirements on equipments and services supplied to oil companies in the pré-sal will have a multiplier effect,

remembering that a third of the annual R\$ 80 billion investment program of Petrobras is linked to the drilling and production of oil. The expertise and scale local suppliers will obtain by servicing the pré-sal will likely help create new streams of exports. The challenge will be to walk the fine line between industrial promotion and inefficiency.

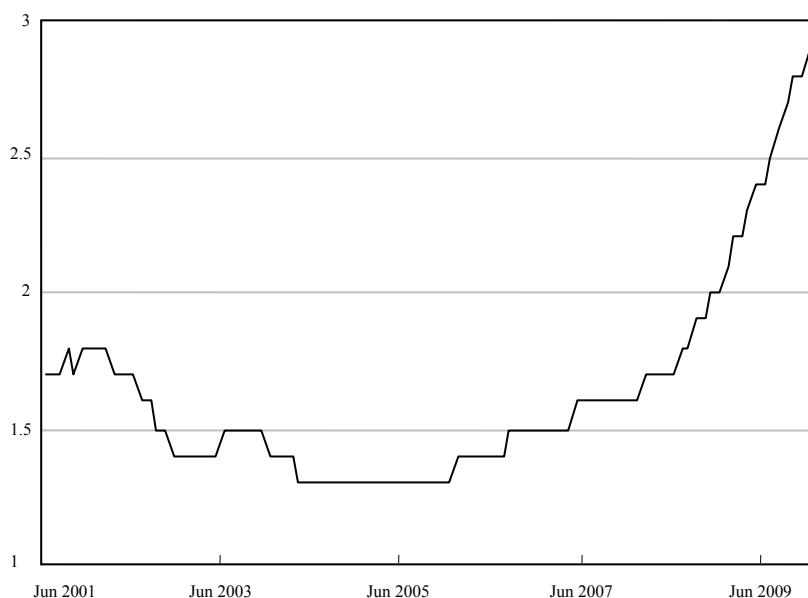
#### 4.2 The scope for further structural reforms

**Reforms adopted since 2003 have proved effective, as demonstrated by the expansion in real estate investment since 2005.** First-generation reforms from the 1990s (e.g., in oil drilling, telecomm, banking) yielded benefits throughout the 2000s. These, have increasingly been accompanied by those from a second generation of reforms implemented after 2003 (Table 4). One of the most effective reforms in the latter group was the one dealing with real estate. This project-finance inspired reform segregated real estate projects against developers' corporate bankruptcy and other risks, providing much more security to buyers and financiers.<sup>5</sup> Coupled with the relaxation of monetary policy and earlier changes in lending rules (e.g., strengthening of repossession of financed houses), it unlocked a huge market, reviving the construction sector even before the "minha casa-minha vida". New house financing rose from 30,000 in the 1990s and early 2000s, to 300,000 more recently, supporting several IPOs of developers. The market is still small, with annual disbursements of just R\$ 30 billion, and the stock of mortgages amounting to just around R\$ 105 billion (*i.e.*, 3 per cent of GDP), but its potential is large (Figure 10).<sup>6</sup>

**Medium-term fiscal spending targets, together with third-generation reforms can reduce aggregate risks, stimulating idiosyncratic risks and investments.** Such spending targets would help agents to assess the impact of fiscal impulses to the aggregate demand and the amount of distortion caused by future taxes. It would thus be a natural improvement over the existing commitment to the primary surplus target. Third-generation reforms could focus on the refinement of existing check-and-balance systems, strengthening

Figure 10

Real Estate Lending – Stock of Residential Loans  
(percent of GDP)



<sup>5</sup> In the 1990s many individual investors lost money because constructors would mix resources from several projects in a common account. Because tax and labor liabilities would have precedence in any bankruptcy situation, problems in one project would quickly affect all projects.

<sup>6</sup> The stock is so small also because the residual, unfunded mortgages from the 1970-90 have been transferred to the resolution fund EMGEA.

Table 4

**The Reform Agenda Accomplished in the Early Years of the Lula Administration**

Law	Topic	Effect
No. 10820/2003	Loans guaranteed by payroll	Lowers cost of personal loans
No. 10833/2003	Makes pis-cofins non cumulative	Reduces distortion of this federal tax
No. 10931/2004	Reforms real estate sector, segregating projects for tax and bankruptcy purposes	Reduces risks for builders and buyers
No. 11079/2004	Introduces PPP	
No. 11101/2004	Bankruptcy law	Changes payment priorities, promotes resale of assets and preservation of concern
No. 11196/2005	Incentives to R&D	Provides tax brakes and stimulus for diffusion of innovations
LC 123/2006	Small enterprises	Consolidates their tax liabilities, reducing overall tax burden to foster formalization
LC 126/2006	Opens re-insurance market	Ends monopoly and opens market to domestic and foreign companies
No. 11445/2006	Sanitation Framework Law	Regulates concessions in the sector
No. 11638/2007	Corporations Law	Subjects accounting rules to control of independent bodies, aligning them with international practice

regulatory agencies and external control of government decisions. This would respond to the want of better coordination among agencies representing stakeholders that often unduly increase the risk surrounding private and public investment and help improve the effectiveness of public spending. It would, for instance, address the incentives for agencies responsible for licenses to procrastinate, rather than give positive or negative responses; or the problem that obtaining a stay from a court (*mandado de segurança*) is rather easy, while deciding on the merit can drag for decades. Improving the governance of macro-processes in the public sector needs not hamper freedom or growth, but rather make rules more clear and objective. Absent that, the tendency would be a sliding towards bullying agencies and the return to discretionary and unaccountable policies from the Executive branch and close-door decisions by public companies.

**That two-pronged approach could pave the way to lower interest rates.** Although rates are below the peaks of the 1990s or early 2000s, they remain surprisingly high, distorting investment and labor decisions and creating incentives for rent seeking, such as below-market rate loans from BNDES. A frontloaded effort in the fiscal would thus reduce the implicit subsidy in BNDES loans, which, at R\$ 10 billion, adds up to almost the cost of the Bolsa Família.<sup>7</sup> It would also help shave government interest payments, which are in excess of 5 per cent of GDP, freeing resources ahead. It is intuitive that the current policy mix of tight monetary policy and expanding fiscal policy is inefficient in an environment where growth quickly translates into price increases because fiscal uncertainty weakens the supply response to shocks in aggregate demand, and large companies borrowing from BNDES are insulated from Central Bank rates. Hence, the good financial

<sup>7</sup> This amount is estimating considering a 5 per cent subsidy on a R\$ 200 billion balance sheet.

indicators currently surrounding the public debt should not be mistaken for a license to spend, even if credit default swaps on Brazilian debts are priced below those on Italy and Spain (e.g., CDS premium of 131 bps for Brazil, versus around 180-240 for those countries). A balanced and sound decline in rates would strengthen Brazilian companies on the whole and probably reduce the need for the government to promote “national champions” through official channels, as well as the incentive for firms to share risks with the government through loans from public banks.

**Sub-national governments provide interesting experiences regarding better quality in public spending.** An often overlooked consequence of the institutional changes triggered by price stability was the pressure on subnational governments to focus on better service delivery. Without the smoke of inflation, subject to the Fiscal Responsibility Law, and with little room to issue debt, state governments changed their way to do business, focusing on core areas such as health, education and public security, which are essential to long-term growth. Increased commitment to transparency, stronger compliance rules, and better internal controls were promoted, together with more effective rapports with controlling agencies.<sup>8</sup> New, ambitious programs for automating and integrating taxes, spending and their accounting using corporate systems (e.g., SAP/Oracle ERPs) are also under way.

**Given the excellent financial infrastructure of Brazil, further confidence on fiscal and macroeconomic balances could facilitate the tapping of local capital markets.** Clearing, custody, as well as trading and underwriting technology and systems are state of the art in Brazil. The Brazilian Exchange BOVESPA is one of the four most valuable exchanges in the world, and the overall market capitalization of listed companies is at par with that of Spain and Germany. Over the counter clearing institutions are also nimble and secure. Pension funds, investment funds, and insurance companies have thrived since the reforms of the early 2000s, creating a robust and increasingly well regulated sector of institutional investors eager to find new outlets for their savings. Thus, the share of capital market debt in the balance sheet of industries doubled in 2006-07 and amounted to 8 per cent of GDP in 2008, while bank loans excluding those using earmarked/public funds have stagnated. With less aggregate risk and the ensuing lower interest rates, the BOVESPA plan to list up to 200 new companies in the coming years could become reality and dramatically facilitate the financing of corporations and infrastructure, sustaining growth.

## 5 Concluding remarks

**The success of the response to the crisis validates the policy choices of the last 15 years.** The success in deploying anti-cyclical instruments should not be confused with a license to weaken the fiscal stance in the medium term and expand public companies in a thoughtless way, but rather be seen as a sign of the potential of third-generation reforms. Sedimentation is one of the strengths of Brazil, which helped consolidate the reforms of the 1990s and promote a new round of changes in 2003-06, all along boosting the confidence in the policy formulation and implementation process. This cycle should be extended in the aftermath of the 2008 crisis, through the elimination of any doubts about the country’s solvency. This would be especially favorable to growth, considering the new opportunities opened up by the pré-sal oil discoveries, long-term trends in international trade and capital flows, as well as the large market driven by a burgeoning middle class. Discipline on public financing of banks should not be weakened, in light of past experiences

<sup>8</sup> In Rio de Janeiro, oil revenues, for instance, are channeled to the public servants pension fund, insulating the rest of the government from the fluctuations in oil prices, and guaranteeing great transparency in the use of these receipts. Better governance has also helped the nature conservancy fund FECAM financed with a small share of those oil revenues to deliver consistent results, with lower agency costs. Also, on-line disclosure of every payment and other measures to improve transparency and predictability have allowed the government to expand partnerships with the private sector and lower acquisition costs significantly.



and of the vitality of domestic capital markets. Instead, the focus should be on improving the quality of public spending and regulatory agencies, and on developing a new framework to reinforce instances of social control, to foster accountability without unduly slowing down investment projects. Confidence in the fiscal outlook, together with yet more clarity on the functioning of institutions, would help avoid overlapping demands from licensing bodies and stimulate greater use of capital markets, fostering investment and growth.

## APPENDIX

Table 5

## Gross and Net Debt of the General Government of Brazil

Item	R\$ million				2009/08 percent change	percent of GDP			
	2006	2007	2008	2009		2006	2007	2008	2009
<b>Net debt of General Government (C+F+I+J)</b>	<b>1,091,255</b>	<b>1,181,418</b>	<b>1,175,203</b>	<b>1,378,129</b>	<b>17.3%</b>	<b>46.0</b>	<b>44.4</b>	<b>39.1</b>	<b>44.0</b>
<b>Gross Debt of General Government (C=D+E)</b>	<b>1,336,645</b>	<b>1,542,852</b>	<b>1,740,888</b>	<b>1,973,424</b>	<b>13.4%</b>	<b>56.4</b>	<b>58.0</b>	<b>57.9</b>	<b>62.9</b>
<b>Domestic Debt (D)</b>	<b>1,186,058</b>	<b>1,426,087</b>	<b>1,595,878</b>	<b>1,861,984</b>	<b>16.7%</b>	<b>50.0</b>	<b>53.6</b>	<b>53.1</b>	<b>59.4</b>
Treasury Bonds and Notes	1,073,652	1,204,314	1,236,732	1,369,262	10.7%	45.3	45.3	41.2	43.7
Open Market BCB Operations	77,367	187,416	325,155	454,710	39.8%	3.3	7.0	10.8	14.5
Federal Government Loans	2,090	2,216	2,103	2,262	7.6%	0.1	0.1	0.1	0.1
Liabilities to CEF – Law 8,727/1993	23,585	22,194	20,358	17,630	-13.4%	1.0	0.8	0.7	0.6
State Loans	6,339	6,425	7,276	12,546	72.4%	0.3	0.2	0.2	0.4
Municipal Loans	2,890	3,371	4,253	5,574	31.1%	0.1	0.1	0.1	0.2
<b>External Debt (E)</b>	<b>150,587</b>	<b>116,764</b>	<b>145,010</b>	<b>111,440</b>	<b>-23.2%</b>	<b>6.4</b>	<b>4.4</b>	<b>4.8</b>	<b>3.6</b>
Federal Government	136,108	104,433	126,456	94,993	-24.9%	5.7	3.9	4.2	3.0
State Governments	12,545	10,641	16,054	14,440	-10.1%	0.5	0.4	0.5	0.5
Municipal Governments	1,934	1,691	2,500	2,007	-19.7%	0.1	0.1	0.1	0.1
<b>Claims of the General Government (F=G+H)</b>	<b>-465,221</b>	<b>-533,018</b>	<b>-563,425</b>	<b>-830,612</b>	<b>47.4%</b>	<b>-19.6</b>	<b>-20.0</b>	<b>-18.8</b>	<b>-26.5</b>
<b>Domestic Credits (G)</b>	<b>-465,221</b>	<b>-533,018</b>	<b>-563,425</b>	<b>-830,612</b>	<b>47.4%</b>	<b>-19.6</b>	<b>-20.0</b>	<b>-18.8</b>	<b>-26.5</b>
Short Term Assets of the General Government	-247,406	-305,568	-292,507	-445,177	52.2%	-10.4	-11.5	-9.7	-14.2
Cash	-5,528	-7,072	-8,351	-7,746	-7.2%	-0.2	-0.3	-0.3	-0.2
Claims against the BCB	-226,047	-275,843	-255,217	-406,354	59.2%	-9.5	-10.4	-8.5	-13.0
State claims against banks	-14,396	-21,358	-25,993	-29,252	12.5%	-0.6	-0.8	-0.9	-0.9
Loans to official institutions	-12,343	-14,150	-43,087	-144,787	236.0%	-0.5	-0.5	-1.4	-4.6
Subordinated debt	-2,389	-7,504	-7,633	-15,550	103.7%	-0.1	-0.3	-0.3	-0.5
Claims against BNDES	-9,953	-6,645	-35,454	-129,237	264.5%	-0.4	-0.2	-1.2	-4.1
Assets of funds and programs	-50,294	-54,790	-61,700	-73,851	19.7%	-2.1	-2.1	-2.1	-2.4
Claims against SOEs	-20,041	-18,805	-18,977	-16,518	-13.0%	-0.8	-0.7	-0.6	-0.5
Other claims	-12,487	-11,289	-10,974	-10,249	-6.6%	-0.5	-0.4	-0.4	-0.3
Claims of FAT against banks (mostly BNDES)	-122,650	-128,417	-136,181	-140,030	2.8%	-5.2	-4.8	-4.5	-4.5
<b>External Assets (H)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Federal bonds owned by BCB (I)</b>	<b>219,831</b>	<b>171,585</b>	<b>169,156</b>	<b>183,105</b>	<b>8.2%</b>	<b>9.3</b>	<b>6.4</b>	<b>5.6</b>	<b>5.8</b>
<b>Revenues from currency derivatives (J)</b>	<b>0</b>	<b>0</b>	<b>-171,416</b>	<b>52,212</b>	<b>-130.5%</b>	<b>0.0</b>	<b>0.0</b>	<b>-5.7</b>	<b>1.7</b>
<b>Memo Items</b>									
<b>BCB Net Debt</b>	<b>8,481</b>	<b>8,585</b>	<b>-31,922</b>	<b>-39,189</b>	<b>22.8%</b>	<b>0.4</b>	<b>0.3</b>	<b>-1.1</b>	<b>-1.3</b>
<b>Net Debt of SOEs (excludes Petrobras)</b>	<b>12,965</b>	<b>10,795</b>	<b>10,351</b>	<b>6,385</b>	<b>-38.3%</b>	<b>0.5</b>	<b>0.4</b>	<b>0.3</b>	<b>0.2</b>
GDP 12month, deflated by the IGP-DI	2,369,797	2,661,344	3,004,881	3,135,010	4.3%				

Table 6

**Balance of Payments**  
(US\$ million)

Item	2004	2005	2006	2007	2008	2008 Jan-Oct	2009 Jan-Oct
Trade Balance	33,641	44,703	46,458	40,032	24,836	20,920	22,641
Current Account	11,679	13,985	13,621	1,550	-28,192	-24,122	-14,788
Capital Account	372	663	869	756	1,055	906	888
Financial Account	-7,895	-10,127	15,113	88,330	28,297	44,126	51,317
Foreign Direct Investment	8,339	12,550	-9,420	27,518	24,601	19,121	24,311
Outward	-9,807	-2,517	-28,202	-7,067	-20,457	-15,647	5,058
Inward	18,146	15,066	18,782	34,585	45,058	34,768	19,254
Portfolio Investment	-4,750	4,885	9,573	48,390	1,133	9,598	39,331
Stock	-3,875	7486	9,966	49,517	-1,024	9,008	40,040
Fixed Income	2,714	7391	6,278	24,518	-9,208	-5,324	31,970
Other Investments	-10,806	-27,521	14,577	13,132	2,875	15,751	-12,494
Errors and Omissions	-1,912	-201	965	-3,152	1,809	-5,560	881
BALANCE OF PAYMENTS	2,244	4,319	30,569	87,484	2,969	15,350	38,298
Memo:							
Current Account/GDP	1.76	1.58	1.25	0.12	-1.79	-1.83	-1.26



# STRUCTURAL ASPECTS OF THE JAPANESE BUDGET

*Michio Saito*<sup>\*</sup>

## 1 Introduction

Japanese fiscal position has been deteriorating over a long time. After the collapse of bubble economy, the Japanese government continues to try to improve the situation and has set targets for fiscal consolidation repeatedly, but it couldn't achieve them. On the contrary, the situation has worsened under the world economic and financial crisis in the last few years.

In this paper, the developments of the Japanese budget structure will be explained first. In both expenditures and tax revenues, there have been factors which have had effects on the enlargement of fiscal deficits. Considering the size of government expenditure to GDP, the most essential problem in Japanese fiscal situation is the lack of tax system which can gain enough revenues as fiscal resources. But such situation means on the other hand there is room to increase the tax burdens to cover the fiscal gap.

As a conclusion it will be pointed out that Japanese fiscal policy faces challenging situation to achieve fiscal consolidation in moderate economic growth under population aging.

The Japanese government has decided its new fiscal consolidation plan on June 22, 2010. The recovery of the fiscal soundness will be pursued along the plan.

## 2 Trends in the Japanese budget structure after the bubble era

Even in the bubble era around 1990, when the fiscal balance of Japan's general government was in surplus, the fiscal balance of central government was slightly in deficit. After that, Japan's fiscal balance has been deteriorating and the deterioration was mainly in the central government, especially in these 10 years (Figure 1). So the focus of this paper is mainly on the central government.

But it doesn't mean that local governments are more conscious about fiscal soundness. The central government has increased fund transfer to the local governments so that they can cope with the problems under economic downturn. This fund transfer worsened the fiscal balance of the central government on one side, prevented the deterioration of local fiscal situation on the other side. The difference of fiscal situation between the central government and the local governments can be seen caused rather by political power balance.

To the mid-1990s, debt services cost was about half of the central government's fiscal deficit, reflecting a relatively high interest rates at the time of bubble boom. Since late 1990s the greater part of fiscal deficit has been structural (Figure 2).

Despite the huge amount of debt, the portion of interest payment has become rather small as a result of lowering level of interest rates in the sluggish economy. But it contains future risk, as interest rates could go higher when the economic growth become stronger and private investments increase.

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The article is based on the author's personal views and should not be regarded as reflecting official stance of the Japanese Government or the Ministry.

Figure 1

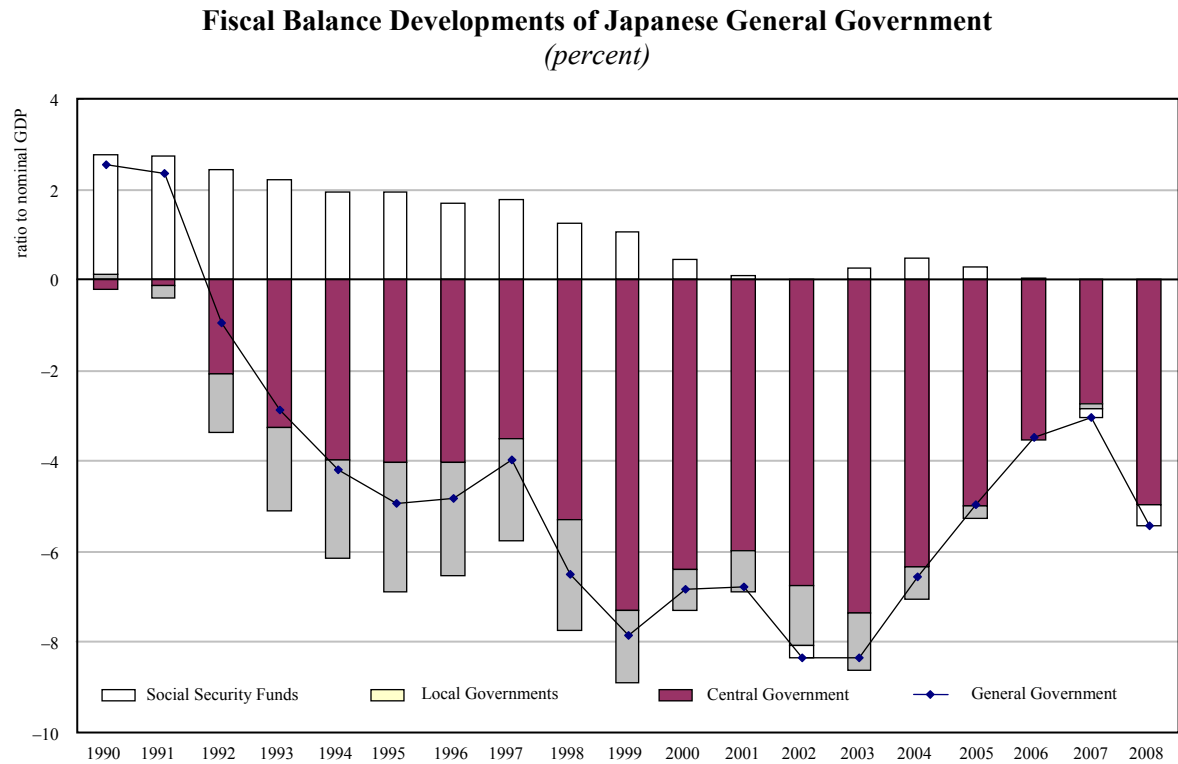


Figure 2

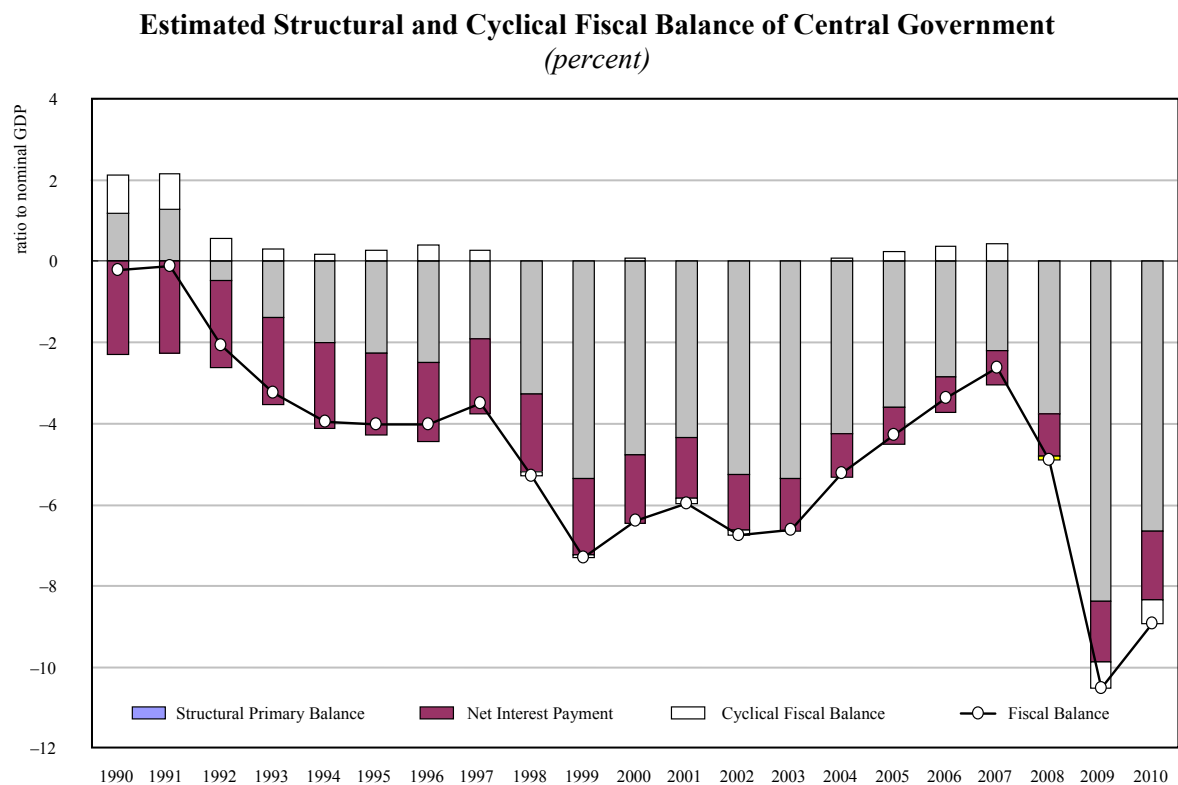
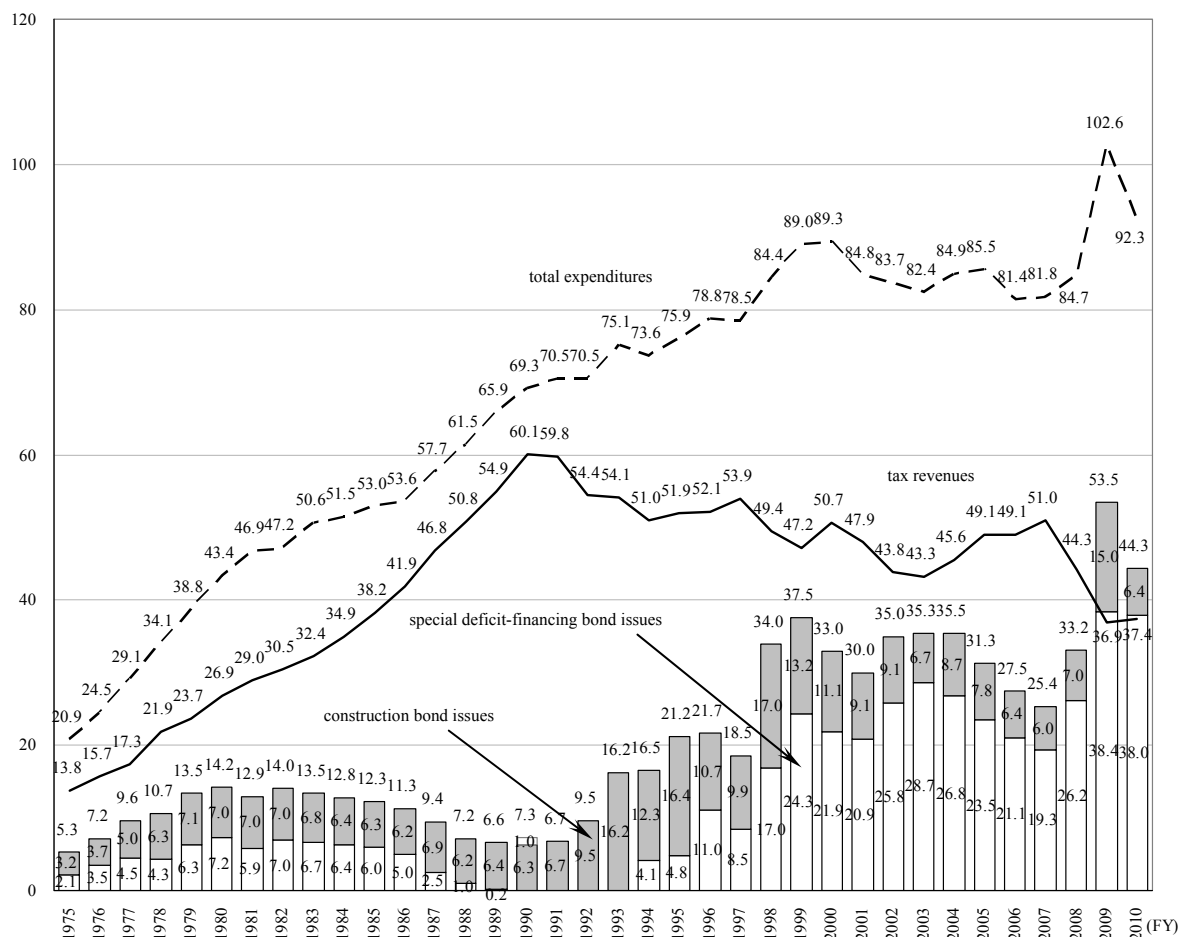


Figure 3

### Trends in General Account Tax Revenues, Total Expenditures and Government Bond Issue (trillion yen)



Notes: FY1975-2008: Settlement, FY2009: Second revised budget, FY2010: Initial budget.

*Ad hoc* deficit-financing bonds (approx. 1 trillion yen) were issued in FY1990 as a source of funds to support peace and reconstruction efforts in the Persian Gulf Region.

Estimated portions of cyclical fiscal balance in 2009 and 2010 seem rather small despite that in the global economic and financial crisis Japan's tax revenues decline drastically (2008: 44 trillion yen → 2009 and 2010: 37 trillion yen). The biggest lost revenue was the corporate tax revenue, which decreased in 2009 to the level of half of the previous year (2008: 10 trillion yen → 2009: 5 trillion yen). The gap between the estimated cyclical portion and the actual tax revenue decrease suggests that calculation of cyclical components using the output gap and the tax elasticities causes underestimation of cyclical effects on Japanese fiscal balance.<sup>1</sup>

For the deterioration of Japanese fiscal balance, both of the expenditure side and the revenue side have been affected. Trends in total expenditures and tax revenues of general account show that total expenditure continues to increase since late 1970s on the one hand, tax revenues are in

<sup>1</sup> On the calculation of cyclical and structural factor, please see "Cyclical and Structural Components of Corporate Tax Revenues in Japan" by my colleague Mr. Ueda.

Figure 4

**Factor Analysis of the Japanese Budget Balance**  
(percent of GDP)

	1990 (peak year of the Tax Revenues)		2000		2007 (before the economic crisis)		2010
Fiscal Balance	-0.9%		-4.3%		-2.6%		-7%
Total Expenditures (excluding Debt Redemption Expenses)	14.6%		15.5%		13.6%		17.1%
Social Security	2.5%	Increase of Social Security Expenditures	3.5%	Increase of Social Security Expenditures	4.1%	Increase of Social Security Expenditures	5.7%
Public Works	1.5%	Increase of Public Works	2.4%	Decrease of Public Works	1.4%	Decrease of Public Works	1.2%
Tax Revenues	13.3%	Tax Reduction etc. decrease of Tax Revenue	10.1%	Tax Reduction etc. decrease of Tax Revenue	9.9%	Tax Reduction etc. decrease of Tax Revenue	7.9%
Nominal GDP	451.7 tri.yen	Average growth rate 1.1%	504.1 tri.yen	Average growth rate 0.2%	515.7 tri.yen	Average growth rate -0.8%	475.2 tri.yen
Ratio of people aged 65 and over	12.1%		17.4%		21.5%		23.1%

Figures represent the general account-based data.

downward trend after 1990 on the other hand. As a result bonds issuance has been increasing and accelerates recently as consequences of global crisis. In these two fiscal years, the borrowing becomes bigger than the tax revenues, which is an extraordinary situation never seen since immediately after the World War 2 (Figure 3).

In the increasing trend of expenditures, public works were first increased in order to add public demands in the aftermath of bubble burst, then declined in these ten years. Caused by the population ageing, continuous increase in social expenditures is observed. On the revenue side, tax revenues continue to decrease. Very low growth rate or the decrease of nominal GDP caused by deflation worsens the situation through lowering tax revenues and making fiscal adjustments more difficult (e.g., to decrease the ratio of expenditure to GDP, to restrict the increase of expenditure in growing economy is easier than to cut expenditure actually in non-growing economy) (Figure 4).

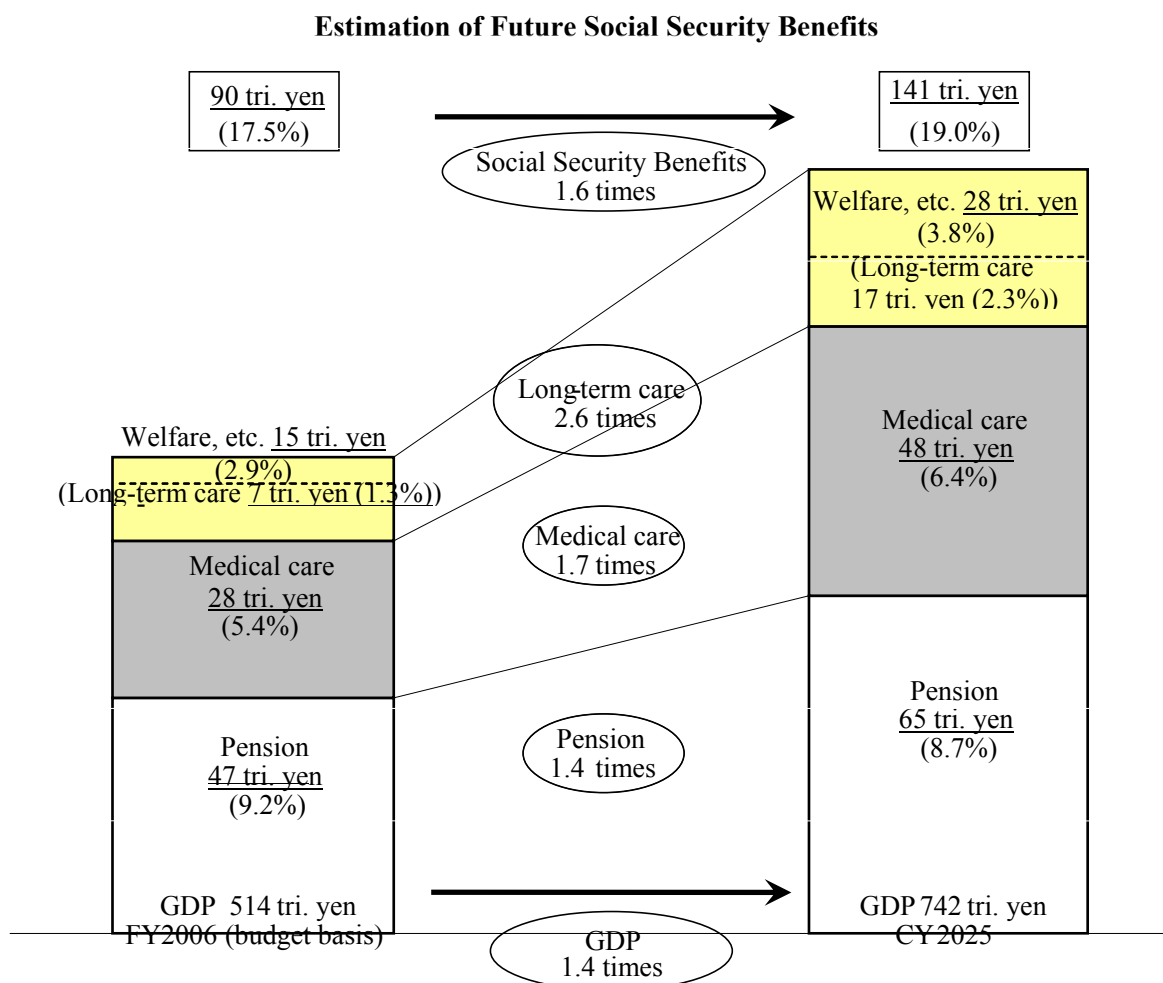
### 3 Structural problems in expenditures

#### 3.1 Social expenditures

Social security benefits, especially in the area of medical insurance and care insurance, are estimated to expand faster than the economic growth (Figure 5). Behind the increase of social security benefits there is a demographic factor. In Japan, not only the increase of elder people but also the decrease of people at working-age makes the situation more difficult (Figure 6).



Figure 5



Note: Figures in parentheses represent the percentage of GDP.

Source: Estimation by the Ministry of health, Labour and Welfare (May 2006).

### 3.2 Public works

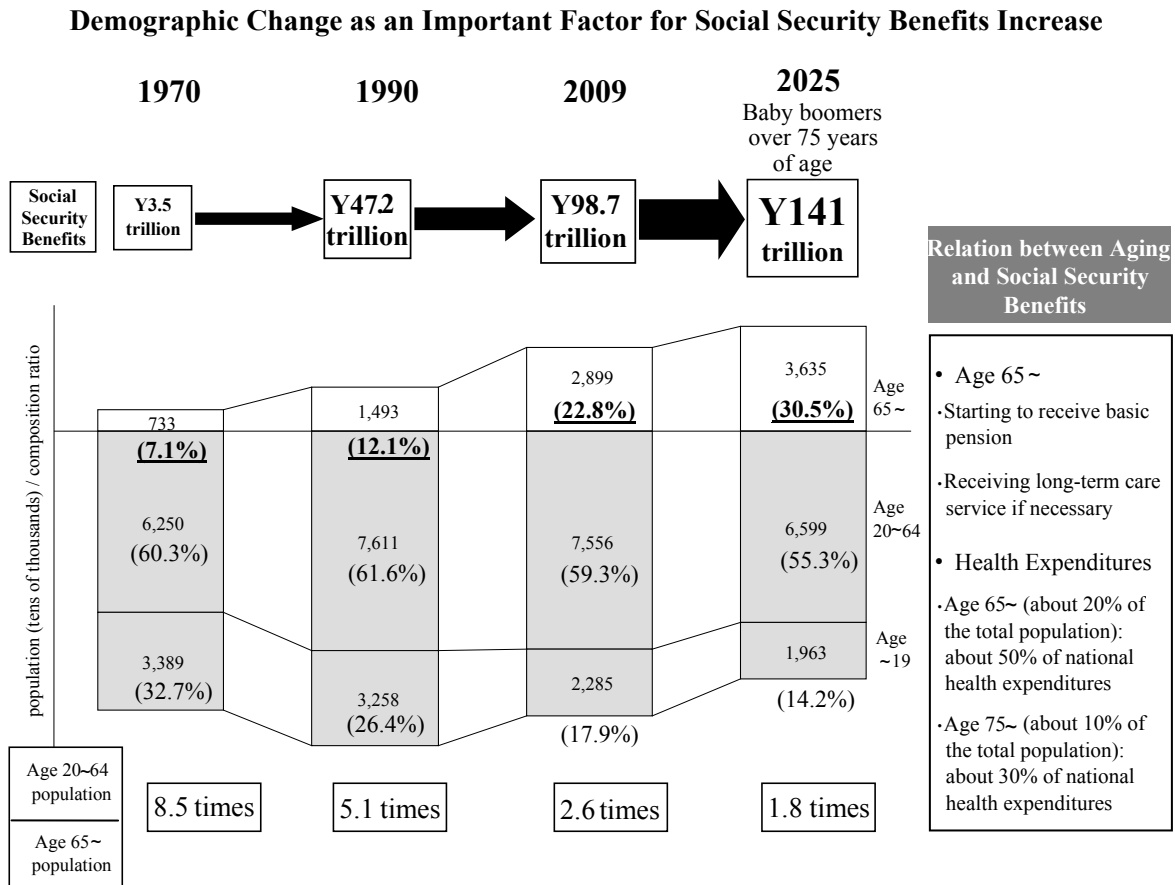
The level of Japan's governmental investment was once much higher than another advanced countries. The level is declining in these ten years but is still relatively high (Figure 7).

The high level of public works expenditures implies room for reduction, but increase of old infrastructure facilities over 50 years might limit room for expenditure cut as higher cost for repairs and maintenances would be required (Figure 8).

### 3.3 Debt service cost

In these 25 years, size of debt outstanding becomes four times but interest payments have been leveling off under the situation of continuous decrease of interest rate. Now the movement of interest rate seems like hitting the bottom (Figure 9).

Figure 6



Note: Baby boomers: born in 1947-49.

#### 4 Structural problems in revenues

After 1990, almost all Japan's major tax reforms were tax reductions except the consumption tax rate increase in 1997 (Figure 10). The motivations of tax cuts were both economic stimulus in recessions and rather structural ones like corporate income tax reduction in order to improve the competitiveness of Japanese companies.

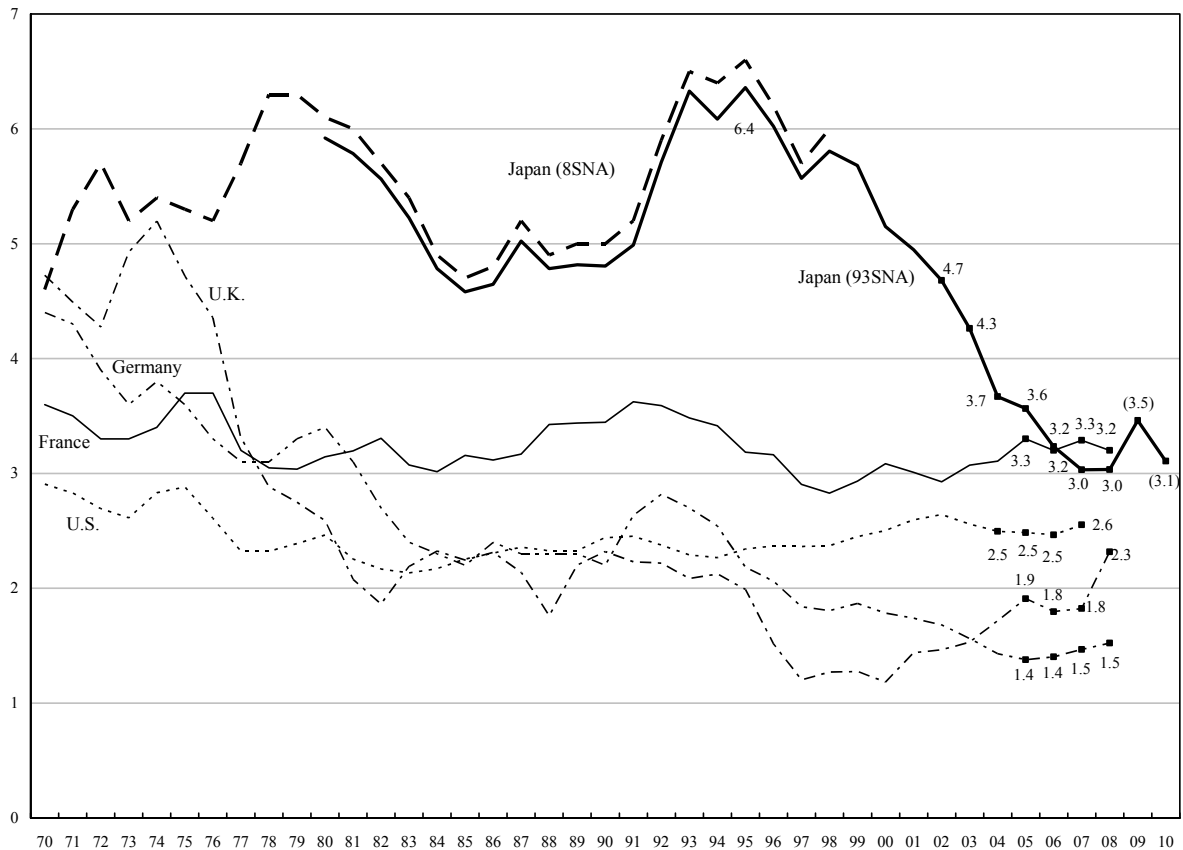
Japan's tax system has not succeeded to produce sufficient revenues, not only because of economic downturn but also as a result of repeated tax reductions.

#### 5 Narrow path to exit

International comparison in OECD countries of the size of general government expenditures (excluding social security benefits) shows that Japan's government is one of the smallest (Figure 11). Even when including social security benefits, Japan's rank is a bit higher but the difference is not so big.

Figure 7

**Trend of the Governmental Gross Fixed Capital Formation  
(percent of GDP)**



Sources: Data on Japan from Cabinet Office, *National Accounts* (fiscal year basis). For other nations: OECD, *National Accounts 2009 Vol. 2*, (calendar year basis).

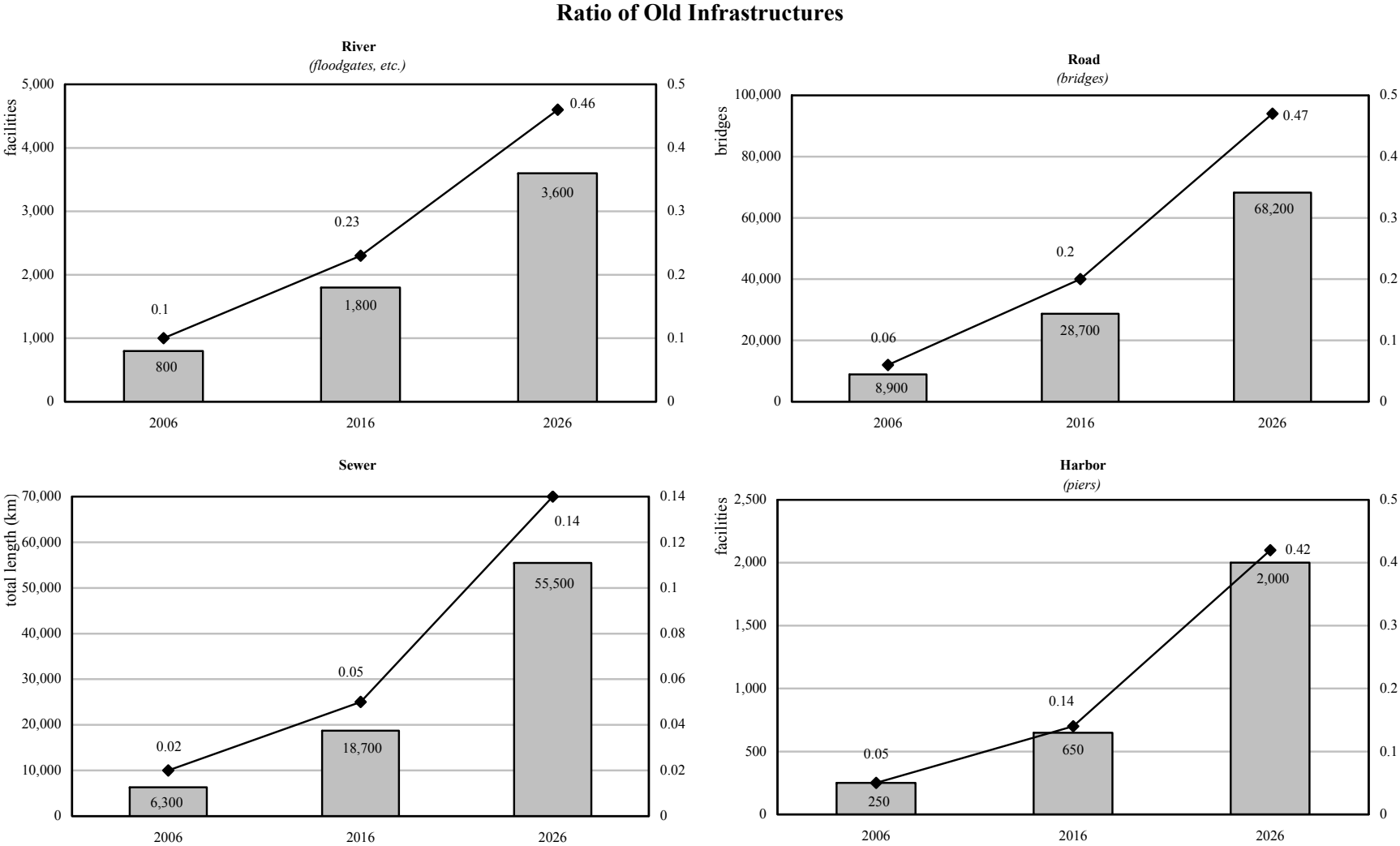
Comparison of national burden ratio shows same tendencies. Japan's national burden ratio is very low and tax burden is one of the smallest in OECD (Figure 12).

Taking into consideration the observations presented in this paper, some implications for coming Japanese fiscal consolidation can be drawn.

- Relatively low level of tax burden implies the possibility of revenue reform.
- Room for expenditure cut seems rather limited. But reduction of so-called "wasteful expenditures" is still necessary to gain people's wider support for tax increase.<sup>2</sup>
- Exit from deflation is indispensable precondition for successful fiscal consolidation.
- Because of rapid population ageing, expected Japan's economic growth in future would remain moderate. Adequate speed for Japan's fiscal consolidation might be slower than in other advanced economies. Hasty implementation of fiscal tightening could be harmful.

<sup>2</sup> There are many literatures suggesting that fiscal consolidation would be more successful through expenditure cut, but Japan's situation should be seen as rather unique because of its small government size.

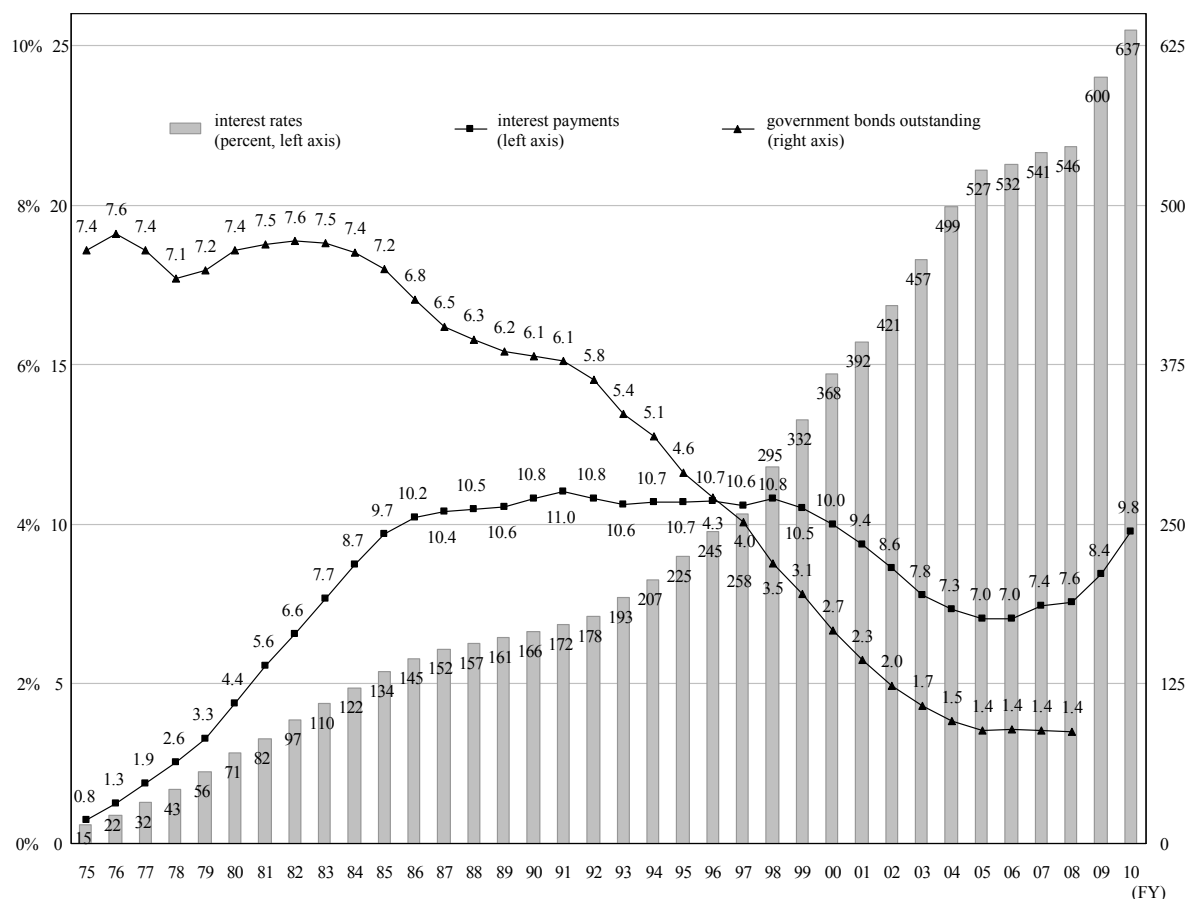
Figure 8



Bar graph: number of the facilities constructed over 50 years ago (Left scale). Line graph: ratio of the facilities constructed over 50 years ago (Right scale).

Figure 9

### Trends in Interest Payments and Average Interest Rate (trillion yen)



Notes: Interest Payments for FY1975-2008: *Settlement*; FY2009: *Second Revised Budget*; FY2010: *Initial Budget*.  
Government bonds outstanding for FY1975-2008: *Actual*; FY2009: *Second Revised Budget*; FY2010: *Initial Budget*.

On 22 June, Japanese Government took a Cabinet Decision on a Fiscal Management Strategy. The Strategy reflects the ideas described above and sets new fiscal consolidation targets in both aspects of flow and stock.<sup>3</sup>

#### Flow targets:

- By FY2015 at latest, halve primary balance deficit relative to GDP from the level in FY2010.
- By FY2020 at latest, achieve primary balance surplus.
- Continue fiscal consolidation efforts in and after FY2021.

<sup>3</sup> The pace of fiscal consolidation set in these targets is a bit slower than in other advanced countries. The G-20 Toronto Summit Declaration describes that “advanced economies have committed to fiscal plans that will at least halve deficits by 2013 and stabilize or reduce government debt-to-GDP ratios by 2016. Recognizing the circumstances of Japan, we welcome the Japanese government’s fiscal consolidation plan announced recently with their growth strategy”.

Figure 10

## Major Tax Reforms

	Drastic tax reform (1988, 1989)	Tax reform (1994)	Permanent tax reduction, etc. (1998, 1999)	2003 ~								
Taxation on consumption	<ul style="list-style-type: none"><li>Introducing consumption tax (+5.4 tri. yen) 1989 ~</li><li>Streamlining the individual indirect taxes (-3.4 tri. yen) 1989 ~</li></ul>	<ul style="list-style-type: none"><li>Raising the consumption tax rate</li><li>Introducing local consumption tax (+5.1 tri. yen) 1997 ~</li></ul>		<ul style="list-style-type: none"><li>Reducing the tax exempt threshold for small- and medium-size corporations, etc. (+0.6 tri. yen) 2004 ~</li></ul>								
Taxation on individual incomes	<ul style="list-style-type: none"><li>Institutional reduction (Mitigation of progressive tax rate structure, increase in the personal exemption, application of the special exemption for dependents, etc.) (-5.5 tri. yen) 1987, 1988 ~</li></ul>	<ul style="list-style-type: none"><li>Institutional reduction (Mitigation of progressive tax rate structure, Increase in the personal exemption, Broadening the income bracket for employment income deduction, etc.) (-3.5 tri. yen) 1995 ~</li><li>Special tax reduction<table><tr><td>1994</td><td>1995</td><td>1996</td></tr><tr><td>(-5.5 tri. yen)</td><td>(-2.0 tri. yen)</td><td>(-2.0 tri. yen)</td></tr></table></li></ul>	1994	1995	1996	(-5.5 tri. yen)	(-2.0 tri. yen)	(-2.0 tri. yen)	<ul style="list-style-type: none"><li>Reduction in the highest marginal tax rate (-0.5 tri. yen) 1999 ~</li><li>Special tax reduction<table><tr><td>1998 (twice)</td></tr><tr><td>(-4.0 tri. yen)</td></tr></table></li></ul>	1998 (twice)	(-4.0 tri. yen)	<ul style="list-style-type: none"><li>Review of various deductions (Special deduction for spouses, Public pension deduction, etc.) (+1.1 tri. yen) 2004, 2005 ~</li><li>Transfer of tax revenue sources 2004 ~ [central → local: 3.1 tri. yen]</li></ul>
1994	1995	1996										
(-5.5 tri. yen)	(-2.0 tri. yen)	(-2.0 tri. yen)										
1998 (twice)												
(-4.0 tri. yen)												
Taxation on corporation	<ul style="list-style-type: none"><li>Lowering the basic tax rate, etc. (-0.6 tri. yen) 1987 ~ (-1.8 tri. yen) 1989, 1990 ~</li></ul>		<ul style="list-style-type: none"><li>Lowering the basic tax rates, broadening the tax base (-0.4 tri. yen) 1998 ~</li><li>Lowering the basic tax rates (-2.5 tri. yen) 1999 ~</li></ul>	<ul style="list-style-type: none"><li>Tax reduction for R&amp;D and investment in plant and equipment, etc. (-1.7 tri. yen) 2003 ~ □ 2006: Abolition of the IT investment tax incentives +0.8 tri. yen)</li><li>Review of Depreciation system (-0.7 tri. yen) 2007 ~</li></ul>								
Taxation on others	<ul style="list-style-type: none"><li>Reducing inheritance tax (Mitigation of progressive tax rate structure, Increase in the basic exemptions, etc.) (-0.7 tri. yen) 1988 ~</li><li>Taxation, in principle, at capital gains from stock transfers, etc. (+1.2 tri. yen) 1989 ~</li></ul>	<ul style="list-style-type: none"><li>Reducing inheritance tax (Mitigation of progressive tax rate structure, Increase in basic exemptions, etc.) (-0.3 tri. yen) 1994 ~</li></ul>		<ul style="list-style-type: none"><li>Reduction of inheritance tax reduction in the highest marginal tax rate etc. (-0.2 tri. yen) 2003 ~</li></ul>								

Note: Figures in parentheses represent the sum of the estimation of increase and decrease of national taxes and local taxes (fiscal year).

Stock target: Achieve stable reduction in the amount of public debt relative to GDP from FY 2021.

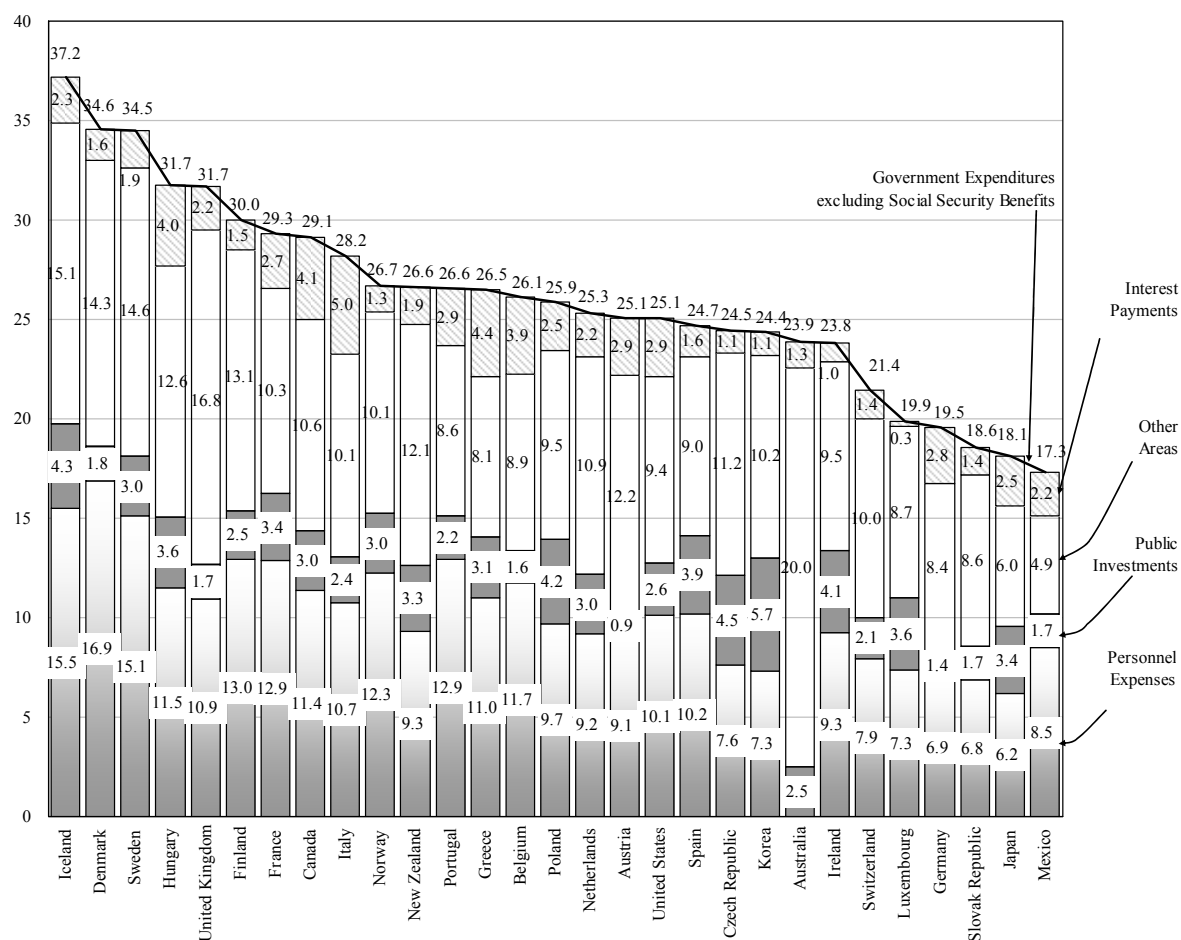
The Strategy also describes the following points:

- The government should make every effort, in cooperation with the Bank of Japan, to bring deflation to an end. By implementing the New Growth Strategy in conjunction with the Fiscal Management Strategy, the government aims at achieving over 3 per cent of nominal growth rate and over 2 per cent of real growth rate on average until FY2020.
- Basic rules on fiscal management as “Pay-as-you-go” rule.
- As measures on the revenue side; the government will soon determine the details of the comprehensive reform of taxes including personal income tax, corporate tax, consumption tax and tax on assets, so that necessary revenue will be secured towards achievement of fiscal consolidation targets.
- As the Medium-term Fiscal Framework; “Overall Expenditure Limit” for General Account is set during FY2011 ~ 2013.

The Japanese Government will pursue to restore fiscal soundness along the Strategy.

Figure 11

**General Government Expenditures excluding Social Security Benefits**  
(percent of GDP)

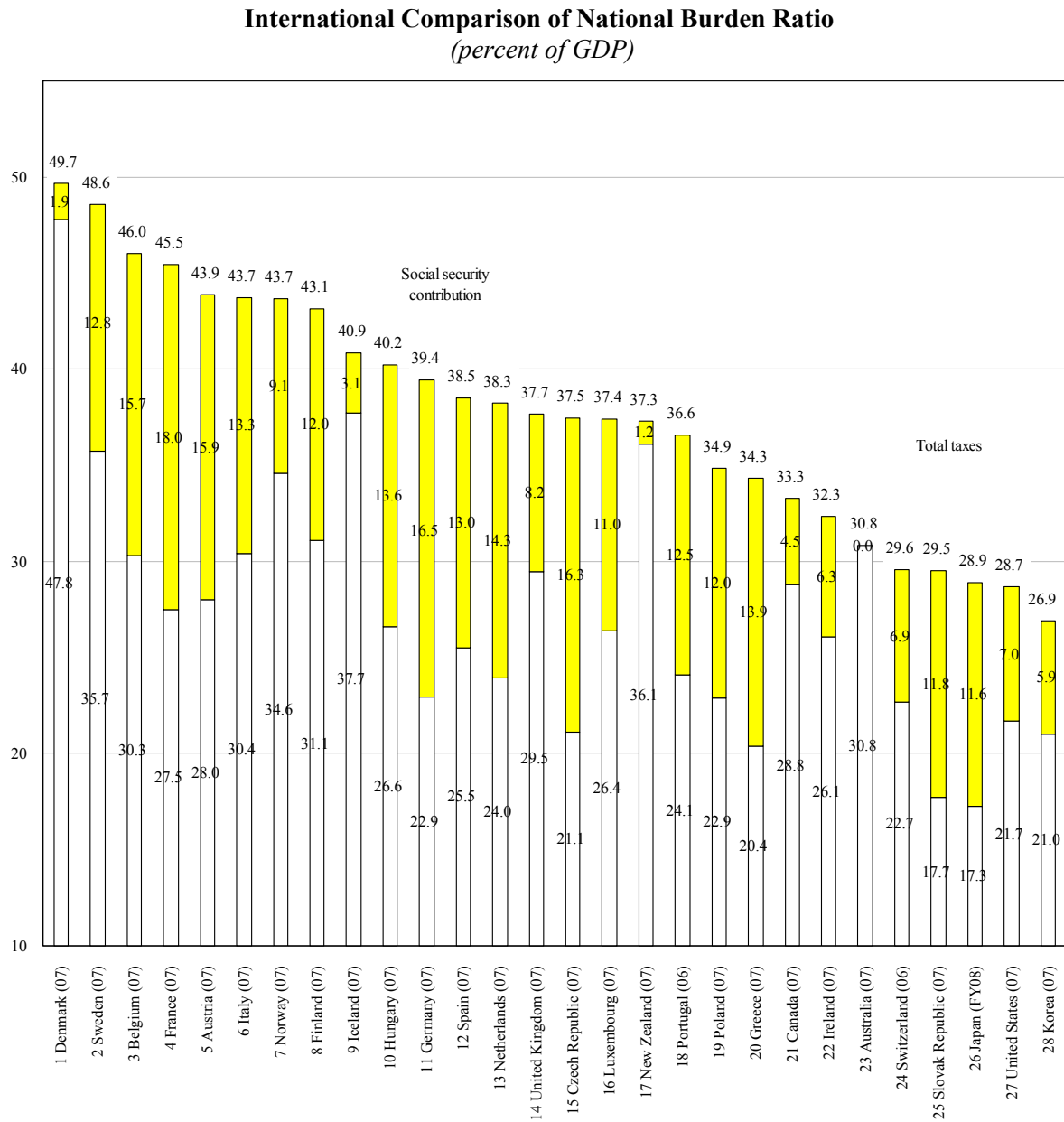


Notes: Australia doesn't include Personnel Expenses because of lack of data.

Japan: FY2007, Other countries: CY2007 (Korea, Switzerland: CY2006, New Zealand: CY2005, Mexico: CY2004).

Source: OECD.

Figure 12



Notes: 28 countries of 30 OECD members' actual figures. The other 2 countries (Turkey and Mexico) do not appear above because of lack of data.

Source: For Japan: Cabinet Office's *National Accounts*, etc. For other countries: OECD, *National Accounts 2009* and OECD, *Revenue Statistics*.



# CYCLICAL AND STRUCTURAL COMPONENTS OF CORPORATE TAX REVENUES IN JAPAN

*Junji Ueda,<sup>\*</sup> Daisuke Ishikawa<sup>\*\*</sup> and Tadashi Tsutsui<sup>\*\*\*</sup>*

## 1 Introduction

In considering fiscal sustainability, it is very important to have an accurate forecast about the size of future tax revenues that can be obtained under the current tax system and economic structure. As is evident from the movement in tax revenues in recent years, the actual size of the tax revenue fluctuates wildly in Japan. When we verify long-term fiscal sustainability, we need to foresee precisely how much tax we can obtain removing effects of temporary economic fluctuation.

As a measure of changes in tax revenue, the size of the elasticity of tax revenue to changes of GDP has been regarded as important numbers. The amount of cyclical tax revenues caused by short-term economic fluctuation can be estimated by multiplying the size of GDP gap by the estimated number of constant tax elasticity, and the amount of structural tax revenues can be gained by subtracting this amount from the actual tax revenue, according to traditional methods shown in OECD.

It used to be natural to use such method before 1990 in Japan. However, recent movements in tax revenues are considerably unstable, and the actual value of the elasticity of tax revenue calculated has fluctuated sharply as a result. Therefore, calculating the size of structural tax revenues by using the certain number of elasticity is not always appropriate as a basis for discussion to consider medium-term fiscal sustainability.<sup>1</sup>

In this paper we will focus on the fluctuation of Japan's corporate tax revenue and its elasticity since 1980, quantitatively specify the factors which affected the fluctuation, and then discuss appropriate method for the estimation of structural corporate tax revenue. This paper is organized as follows: in Section 2 we will consider the actual corporate tax revenue and elasticity data, as well as the relation between actual tax revenue and Corporation Sample Survey data. In Section 3 and 4 we will carefully look at historical fluctuation of corporate tax revenue in Japan and specify several factors which largely affected it. In Section 5, we estimate the level of structural corporate tax revenues based on regression analysis. In Section 6, we mention some conclusions and needs for future research.

## 2 Corporate tax revenue and elasticity of tax revenue

### 2.1 *Changes of corporate tax revenue to nominal GDP*

Japan's corporate tax revenue data since FY 1980 (general account revenue of central government) (Figure 1) shows that it rose significantly during the economic expansion from 1986

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<sup>\*\*</sup> Senior Economist, Policy Research Institute, Ministry of Finance, Japan.

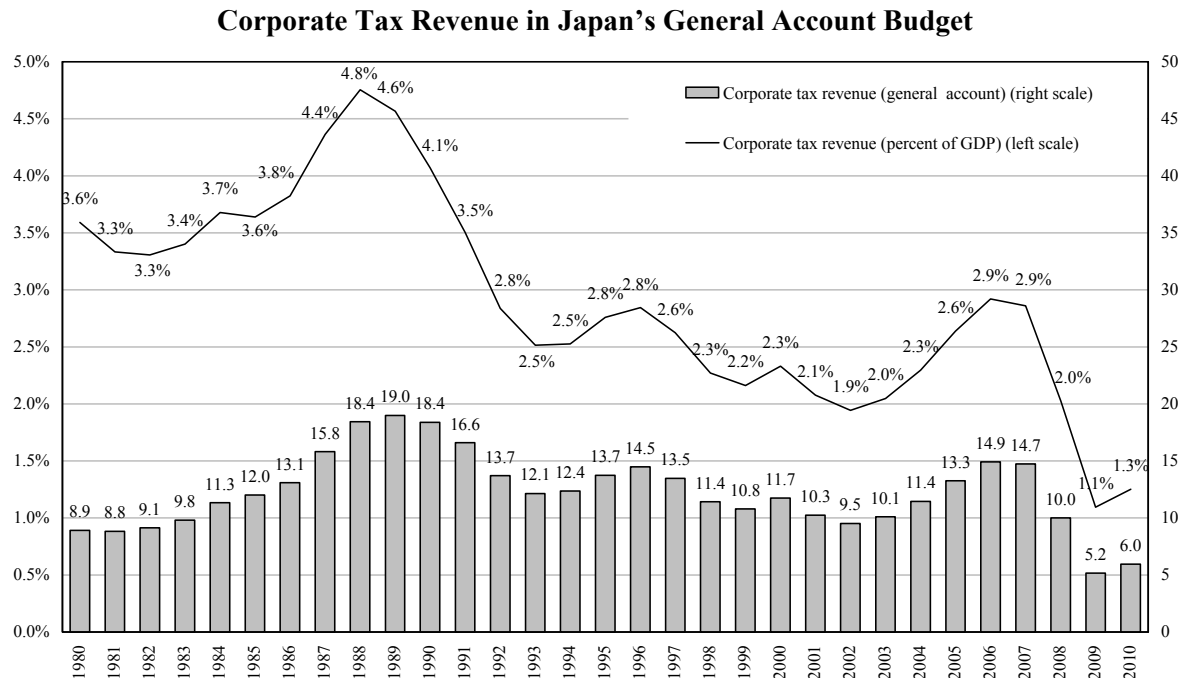
<sup>\*\*\*</sup> Researcher, Policy Research Institute, Ministry of Finance, Japan.

The content of this paper does not necessarily represent the views of the organizations we belong to.

In preparing the paper, Mr. Shigenobu Morita, a researcher at the Policy Research Institute in the Ministry of Finance, Japan, helped us.

<sup>1</sup> As is not discussed in this paper, there proposed various methodology for measuring the size of the GDP gap. And it has been pointed out that a result of estimate based on the latest data available have large errors compared to estimate based on the data available in the future.

Figure 1



Notes: Final budget until FY2008, revised budget in FY2009 and initial budget in FY2010.

Source: Cabinet Office, *SNA*; Ministry of Finance, *Fiscal Financial Monthly Report*.

through 1988 reaching a peak of 4.8 per cent to GDP in 1988, and fell sharply from 1989 with the subsequent collapse of the bubble economy. Since 1993 the sizes of tax revenue had been within a range of 2-3 per cent of GDP. In 2009 and 2010, with rapid economic downturn caused by the financial crisis, the revenue is expected to drop to a level of about 1 per cent of GDP.

In order to decompose and analyze corporate tax revenue, we use the data of Corporation Sample Survey data published by National Tax Administration Agency. Corporation Sample Survey is the extracted sample data with size 51,942 in 2007 (average extraction rate is 2.0 per cent and the companies with capitalization of more than 10 billion yen are exhaustive extraction). The comparison of tax revenue data in Figure 2 shows that the survey data have been below the actual tax revenue due to sampling errors. Therefore, it is necessary to consider the differences. In the following analysis we will use the average tax rate, the size of tax deduction and the distribution of taxable income based on Corporation Sample Survey data.

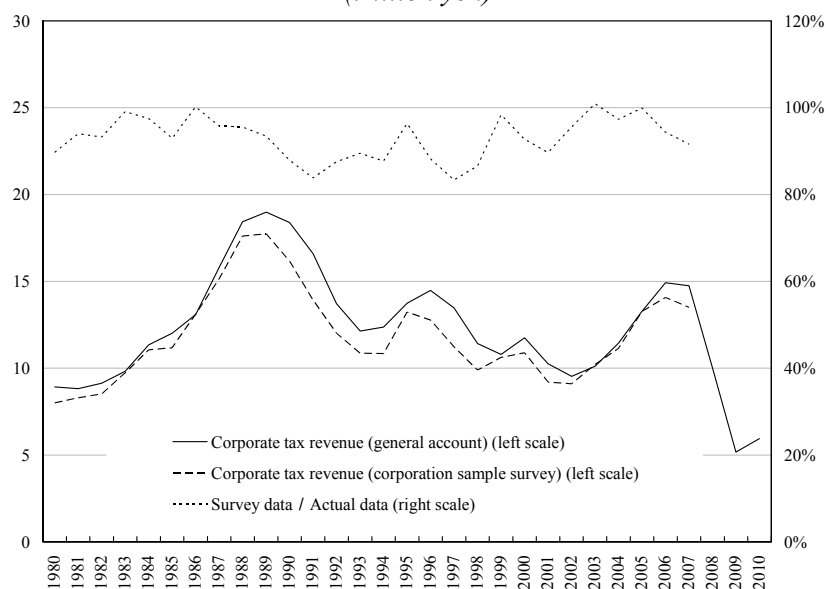
## 2.2 Elasticity of corporate tax revenue

Figure 3 shows the elasticity of total tax revenue (central and local government, *SNA* data) and its decomposition. It is obvious that after the 1990's the total elasticity numbers have been larger and more fluctuating than during the 1980's. We have to note that this variation includes the impact of tax reform, but, even without tax reform factors the relationship between growth rate of tax revenue and nominal GDP in recent years is unstable, especially in corporate tax revenue, as well as income tax.

Figure 4, actual elasticity numbers of corporation tax revenue to GDP, shows some negative numbers and extremely large numbers after the 1990's.

Figure 2

### Comparison of Corporate Tax Revenue (trillion yen)

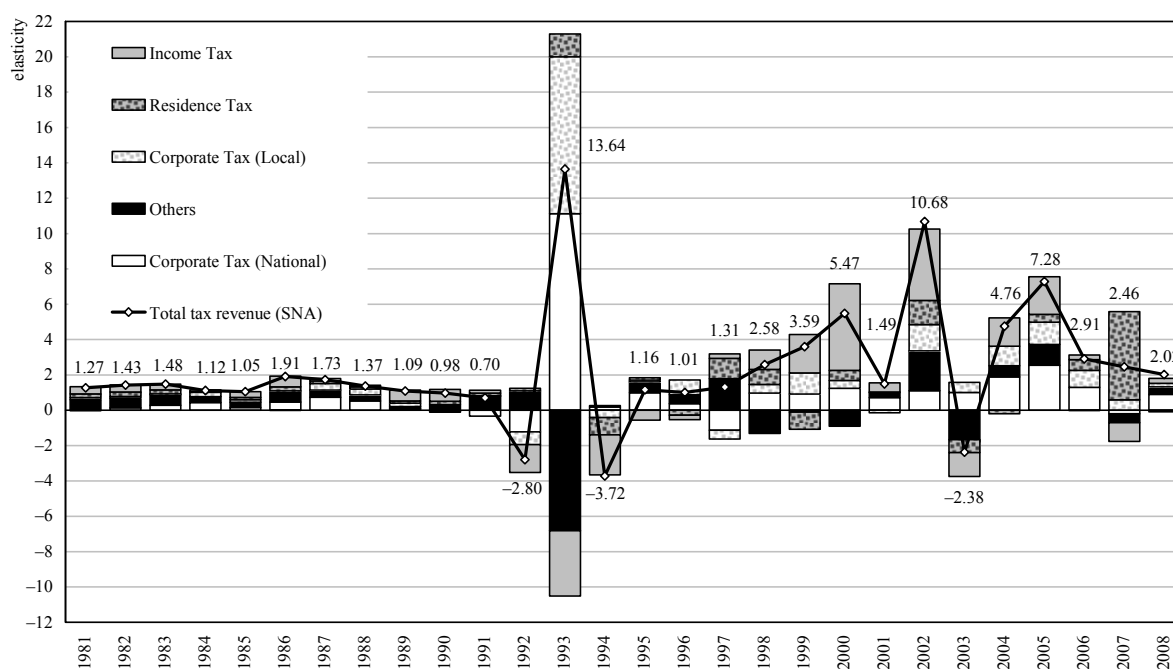


Source: Ministry of Finance, *Fiscal Financial Monthly Report*; National Tax Agency, *Corporation Sample Survey*.

In Japan, since corporate tax rate is almost flat, the cause of the time-varying elasticity is the fluctuation of taxable income to the variation of GDP. The relatively volatile fluctuation of taxable income has been mainly explained by the slower adjustment of compensation of employees than GDP, which causes the short-run large fluctuations of shares of labor income and capital income. Van den Noord (2000) calculates corporate tax base by subtracting wage from GDP, considering the slowly adjustment of labor share (Kitaura, 2009

Figure 3

### The Elasticity of Total Tax Revenue and Its Decomposition



Sources: Cabinet Office, *SNA*; Ministry of Finance, *Fiscal Financial Monthly Report*.

as well). This paper tries to capture the other factors which affect the volatility and elasticity of corporate tax base, such as borrowing interest rate, extra profit and loss and distribution of corporate income<sup>2</sup> and try to estimate the size of structural corporate tax revenues.<sup>3</sup>

As for the size of the elasticity of corporate tax revenue, many attempts to estimate the constant number have been done in previous studies, such as “Annual Economic and Fiscal Report” by Cabinet Administration Office in

2005 (CAO, 2005) which estimated 1.30. Cyclical corporate tax revenue is generally calculated by multiplying GDP gap and tax elasticity, and then structural corporate tax revenue is calculated by subtracting cyclical corporate tax revenue from the actual revenue. The example of structural revenue estimation by CAO (2009) using the number (1.30) shows that it can explain only a small fraction of the tax changes (Figure 5). However, if the elasticity of tax revenue is time varying, the estimated level of structural corporate tax revenue assuming single number elasticity will be biased.

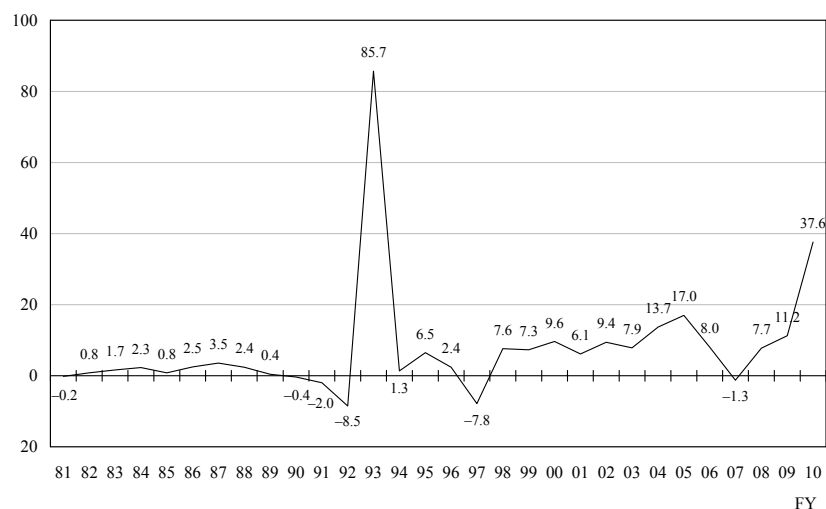
### 3 Average corporate tax rate and tax deduction

In Section 3 and 4, we will analyze the past fluctuation of corporate tax revenue relative to GDP since 1980. This section focuses on the impact of past tax reforms (change of tax rate and deduction system) based on the figures of Corporation Sample Survey data.

The ratio of corporate tax revenue to nominal GDP can be divided into the ratio of “tax calculated” (taxable income multiplied by effective tax rate) to GDP and the ratio of tax deduction to GDP. Figure 6 shows the effective tax rate before deduction (ratio of tax calculated to pretax income of corporation in profit), and statutory corporate tax rate for large companies. The movement of effective tax rate is linked to the statutory rate, although there is a difference of level between the two, due to the reduced tax rate for small companies.<sup>4</sup> After 1999 when the current tax

**Figure 4**

#### Actual Elasticity of the Corporate Tax Revenue (growth rate of corporate tax revenue/growth rate of nominal GDP)



Sources: Cabinet Office, *SNA*; Ministry of Finance, *Fiscal Financial Monthly Report*.

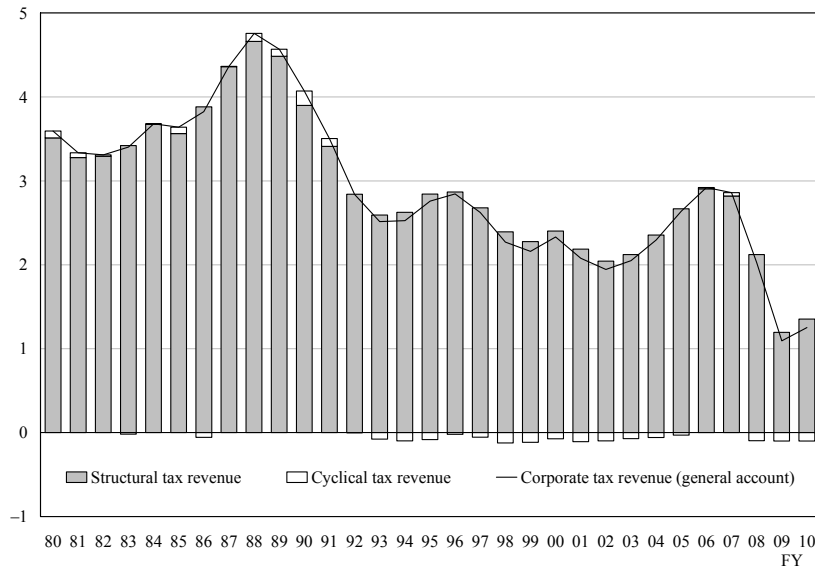
<sup>2</sup> Hayashi (1996) pointed out that fluctuation of dividends and interest payments of private corporations is larger than that of GDP, and Suzuki (2006) pointed out that the factor of changes in corporate tax revenue in recent years is largely affected by the change in the extra profit and loss.

<sup>3</sup> Nishizaki and Nakagawa (2000) acknowledge that the elasticity of entrepreneurial income to GDP can change over time, and tries to estimate the time-varying elasticity of tax revenue. The estimated elasticity is smaller in the boom and larger during recession, with negative correlation to GDP gap numbers.

<sup>4</sup> 22 per cent tax rate applies to the amount of less than 800 million yen of the income of the general corporation whose capital is less than 100 million yen and incorporated association and the total amount of income of public corporations (Law of corporate tax, Article 66).

Figure 5

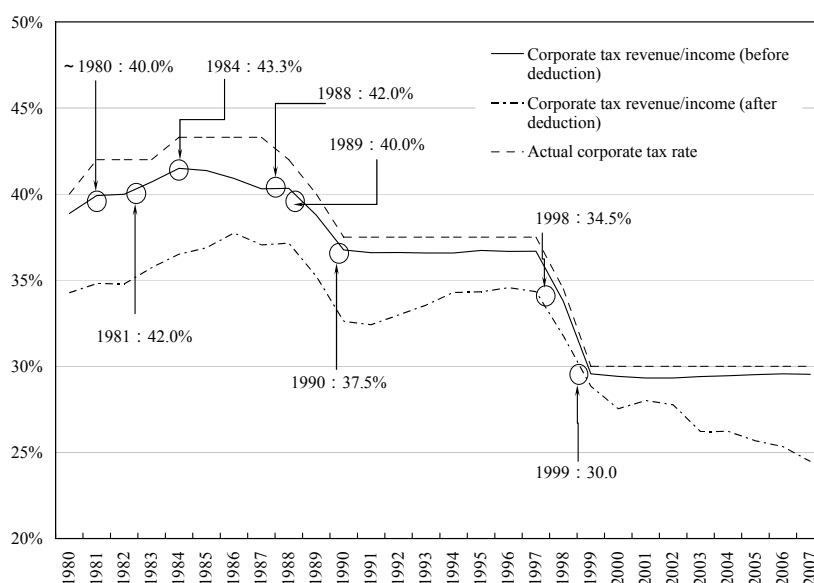
**Cyclical and Structural Corporate Tax Revenue  
with Elasticity Fixed (=1.30)  
(percent of GDP)**



Notes: Final Budget until FY2008, Revised Budget in FY2009 and Initial Budget in FY2010.  
Source: Ministry of Finance, *Fiscal Financial Monthly Report*, etc.

Figure 6

**Ratio of Actual Tax Revenue to Income  
and the Actual Corporate Tax Rate**

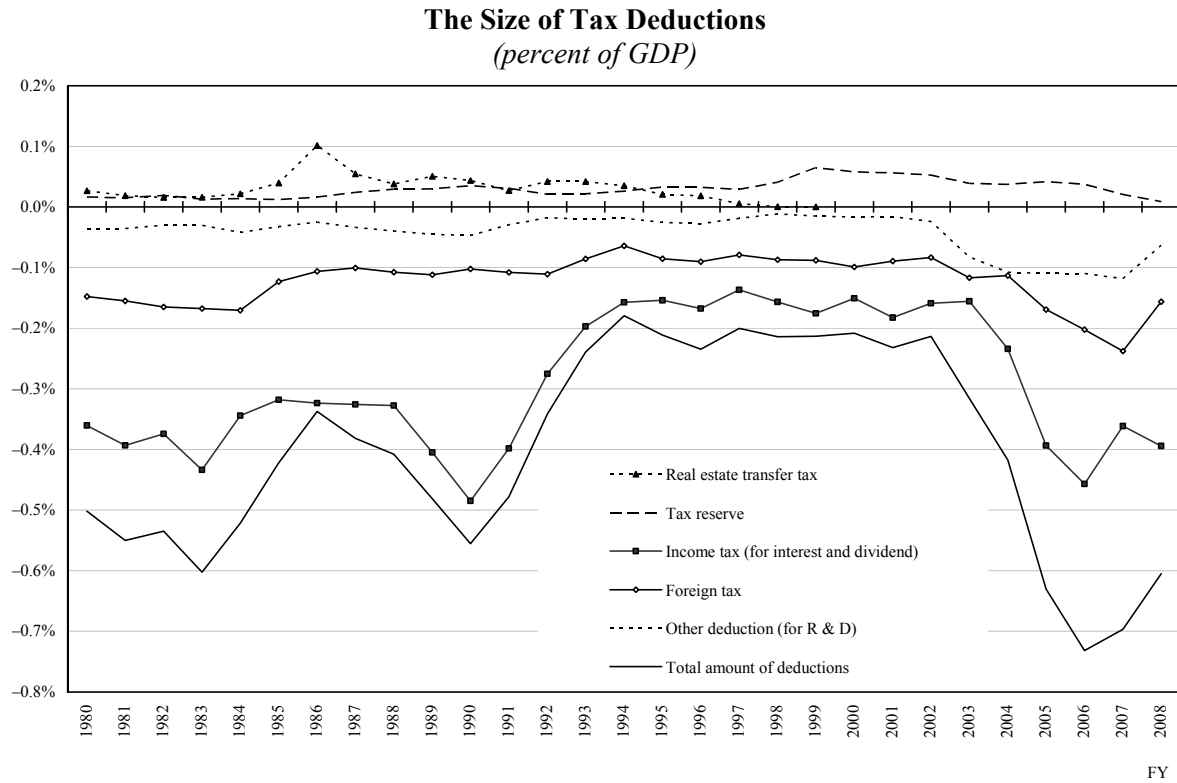


Source: National Tax Agency, *Corporation Sample Survey*, etc.

rate was adopted, the ratio tax of calculated to pretax income of corporation in profit on a macro view remained almost 29.5 per cent and the reduced tax rate is understood to have no significant impact on the movement of the average tax rate.

Difference between the effective tax rate before deduction and the ratio of actual tax revenue after deduction in Figure 6 indicates the amount of tax deduction, and its size has not been stable over time. The change of tax deduction size is shown in Figure 7. "Income tax deduction", which indicates the amount of withholding income tax paid by the corporate enterprises receiving interest and dividend income, has the greatest impact. Although this amount is not recorded as corporate tax, it is appropriate to consider it tax on corporate taxable income. The size of the deduction of income tax in fiscal 2007 counts 0.36 per cent of GDP. In recent years, "foreign tax deduction", "other deductions" (those pertaining to R&D expenses) has increased in size. The latter was introduced by the tax reform of 2003, and in FY2007 the size of tax deduction except income tax credit is 0.36 per cent of nominal GDP.

Figure 7



Source: National Tax Agency, *Corporation Sample Survey*, etc.

#### 4 Fluctuation of tax base

Then, we analyze the historical relationship between tax base (pretax income of corporations in profit) and GDP in detail for non-financial corporations, based on National Accounts (SNA) data and Corporation Sample Survey data. The relation can be shown in Figure 8 and following decomposed ratios are used in the following analysis:

$$\frac{\text{Tax base}}{\text{GDP}} = \frac{\text{Operating surplus}}{\text{GDP}} \times \frac{\text{Entrepreneurial income}}{\text{Operating surplus}} \times \frac{\text{Tax base}}{\text{Entrepreneurial income}} \quad (1)$$

“Operating surplus” is SNA data, net of consumption of fixed capital, which corresponds to aggregate operating income of corporations. For “entrepreneurial income”, we use SNA entrepreneurial income before dividend payment with adjustment of inventory valuation and interest expense.<sup>5</sup> For operating surplus and entrepreneurial income, the positive value of corporation in profit and the negative value of corporate in loss are offset either. “Tax base” is aggregate pretax income of corporation in profit and calculated from actual tax revenue (adding tax deduction and dividing by effective tax rate). The ratio of tax base to GDP and its decomposition from 1980 to 2008 is shown in Figure 9.

<sup>5</sup> Entrepreneurial income of SNA adds up interest payment based on accrual basis, but regarding calculations of ordinary income, it should be based on actual interest payments. Therefore, we created a series of interest payments applying the interest rate calculated from Financial Statements of Corporation Industry data (interest payment divided by debt outstanding) replaced by interest rate SNA applies (interest payment divided by debt outstanding).

Figure 8

## Relationship Between GDP and Taxable Income of Corporation, FY2008

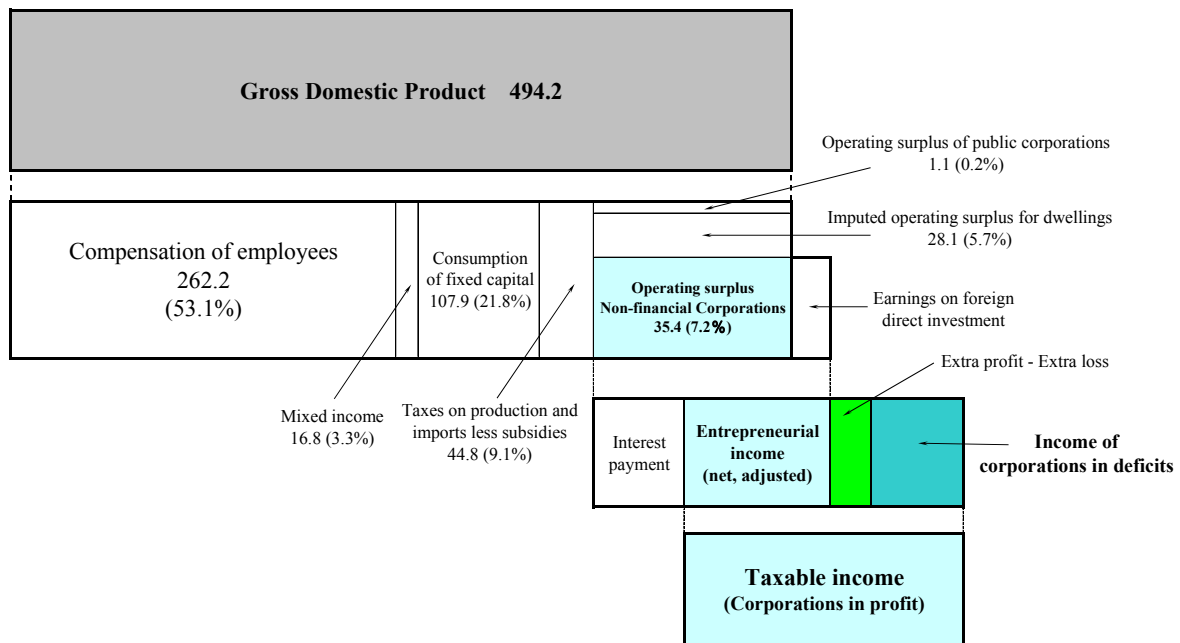
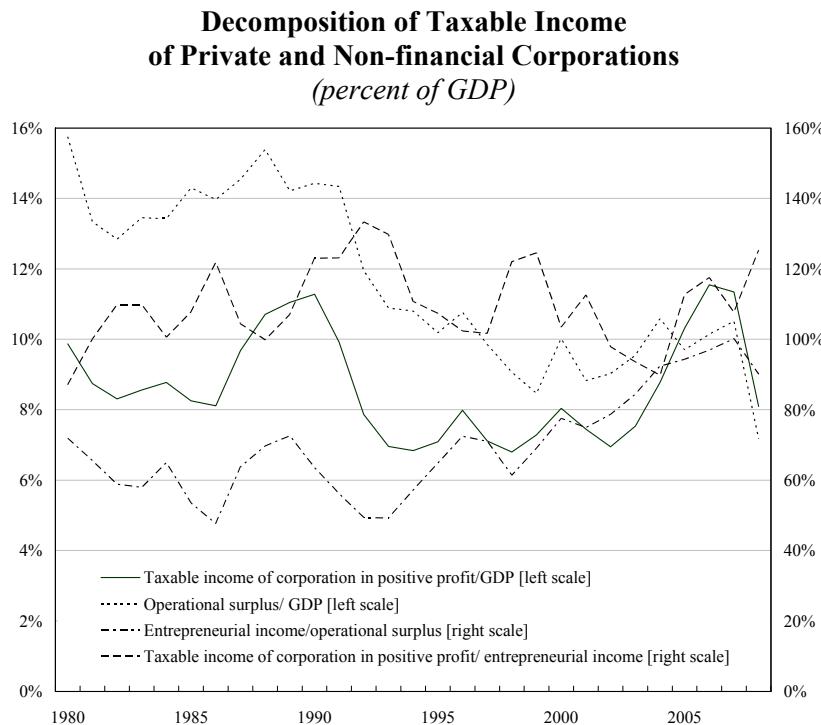


Figure 9

## 4.1 Relationship between operating surplus and nominal GDP – changes in the distribution of GDP

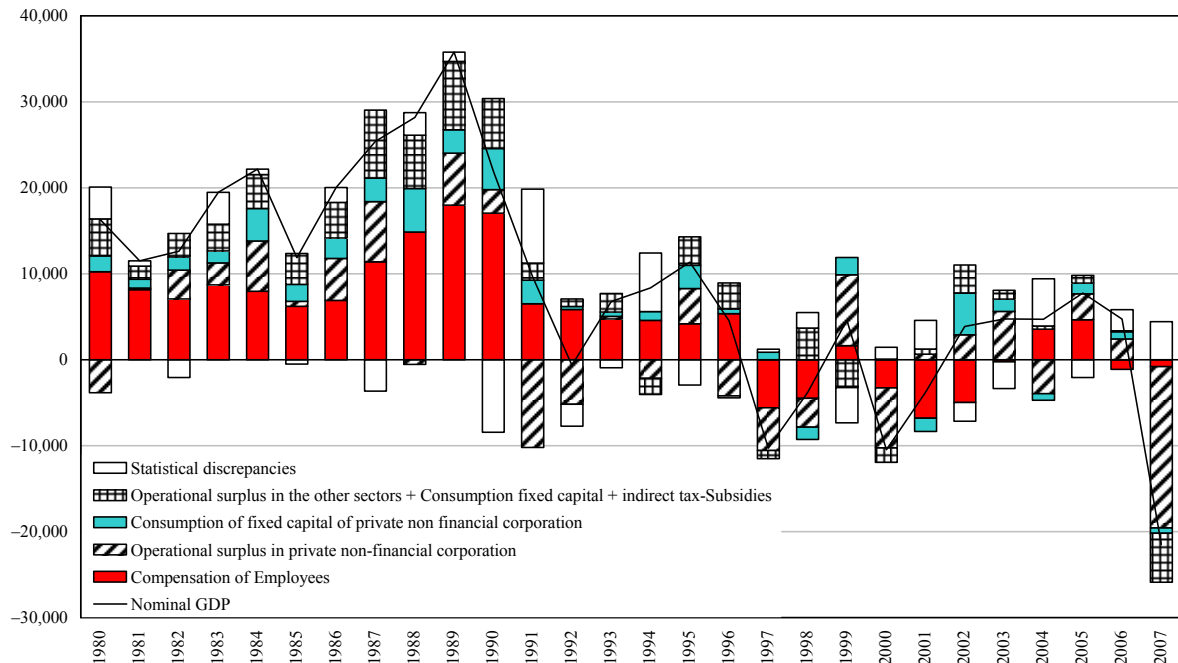


Source: Ministry of Finance, *Fiscal Financial Monthly Report*; National Tax Agency, *Corporation Sample Survey*; Cabinet Office, *SNA*.

The first factor, the ratio of operating surplus to GDP reflects the cyclical and structural changes in the distribution of GDP. The elasticity of operating surplus to GDP had been within the range of 0-2 in the 1980s, but after 1990s its volatility increased. It can be said that the unstable movement of operating surplus relative to GDP in recent years is a major factor to destabilize the elasticity of corporate tax revenue. When we look

Figure 10

**The Breakdown of the Change in GDP**  
(relative to the previous year)



Source: Cabinet Office, *SNA*.

at the decomposition of marginal change of GDP every year in Figure 10, during 1980s the share of compensation of employees, operating surplus and consumption of fixed capital had been generally stable, but in the early 1990s it becomes unstable. The ratio of operating surplus sometimes rapidly decreased with the delay of the adjustment of employee compensation in downturn, and sometimes rapidly increased in economic expansion.

On the other hand, looking at Figure 8 again, there seems to be structural decline of the ratio of operating surplus to GDP from the late 1980s through the late 1990s apart from cyclical fluctuations. This change is due to increase of the ratio of consumption of fixed capital and increase of the ratio of operating surplus of owner-occupied dwellings. The share of consumption of fixed capital to GDP has increased by about 5 per cent from 1980 to 2008 (Figure 11), reflecting the accumulation of capital stock and abundance of the amount of capital.

If we assume one good model and a Cobb-Douglas production function with constant capital share, the ratio of gross operating surplus to GDP is expected to be constant over time in a steady state.<sup>6</sup> However, looking at historical data, it can not be ignored that the share of the corporate tax base to GDP, the past 30 years, has structurally declined. When we view the size of the corporate tax base for the future, it is important to consider the trend in labor share, return on capital and proportion of private corporations in total economy.

<sup>6</sup> Assuming CES type for the production function, capital share is not constant and varies depending on  $Y/K$ . Concretely, the elasticity of substitution of labor and capital as  $\sigma$ , if  $0 < \sigma < 1$ , capital share is an increasing function of  $Y/K$ , if  $\sigma > 1$ , capital share is a decreasing function of  $Y/K$ . If  $\sigma = 1$ , it returns to the Cobb-Douglas production function and capital share is constant.



#### 4.2 Relationship between entrepreneurial income and operating surplus – impact of interest expense of corporations

The second factor, relation between entrepreneurial income and operating surplus is equivalent to the relation between operating profit and ordinary profit in corporate

accounting, which affected the movement of non-operating income and loss. As most of their changes are attributed to the amount of interest expense that is not included in tax base of the corporate income tax, we will consider the changes of the size of interest payments from private non-financial firms to other sectors.

If the secondary distributional shares of operating surplus to interest, dividends and internal reserves are stable, the ratio of entrepreneurial income to operating surplus becomes constant, but Figure 8 shows the level of the ratio has changed dramatically. This reflects the decline of interest payments to

other sectors (households and financial institutions) under low interest rate policy since late 1990s. We will verify the magnitude of the factors, such as rate of return, borrowing rate and capital ratio by using Financial Statements of Corporation Industry data.

Operating surplus and entrepreneurial income can be theoretically decomposed to the following:

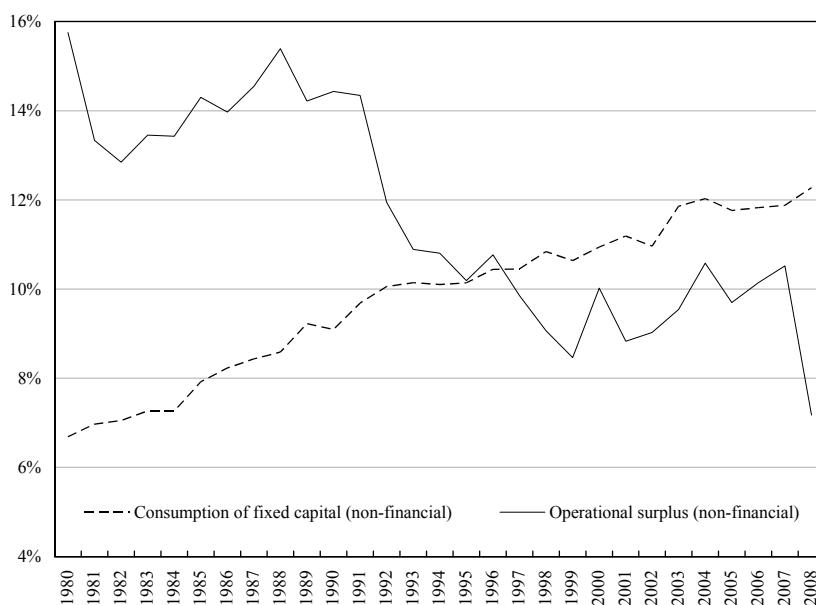
$$\begin{aligned}\text{Operating Surplus} &= rK + iF = r\alpha A + i(1 - \alpha)A \\ &= [\alpha r + (1 - \alpha)i]A \\ &= [\alpha(r - i) + i]A\end{aligned}\quad (2)$$

$$\begin{aligned}\text{Entrepreneurial Income} &= rK + iF - ieA \\ &= r\alpha A + i(1 - \alpha)A - ieA \\ &= [\alpha r + (1 - \alpha)i - ie]A \\ &= [\alpha(r - i) + (1 - e)i]A\end{aligned}\quad (3)$$

where  $A$  is asset of private non-financial corporate,  $K$  is real assets,  $F$  is financial asset,  $\alpha$  is ratio of real assets to total assets,  $e$  is debt ratio,  $r$  is return on capital rate of real asset, and  $i$  is borrowing

Figure 11

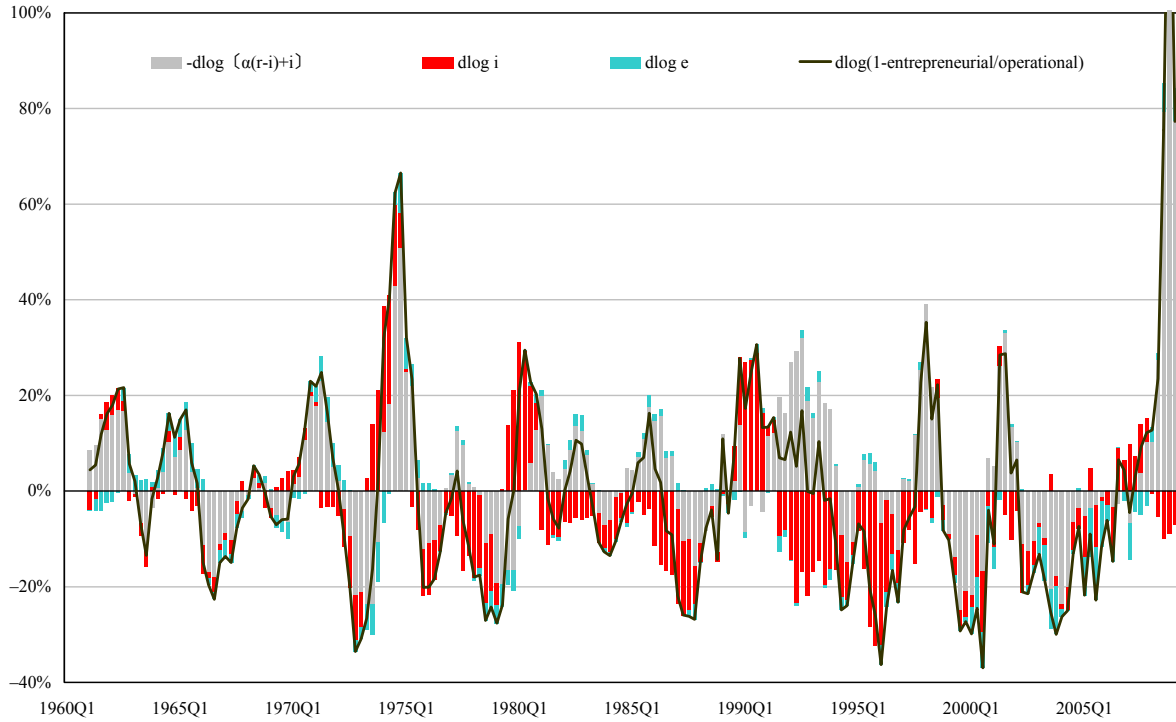
#### Consumption of Fixed Capital and Operational Surplus (percent of GDP)



Source: Cabinet Office, SNA.

Figure 12

## Factor Decomposition of the Ratio of Operational Surplus to Entrepreneurial Income



Source: Ministry of Finance, *Financial Statements of Corporation Industry*.

rate for debt. The ratio between the two (entrepreneurial income ratio) is affected by the borrowing rate  $i$ , debt ratio  $e$ , and difference between  $r$  and  $i$ :

$$\begin{aligned} \frac{\text{Entrepreneurial Income}}{\text{Operating Surplus}} &= \frac{\alpha(r-i) + (1-e)i}{\alpha(r-i) + i} \\ &= 1 - \frac{ie}{\alpha(r-i) + i} \end{aligned}$$

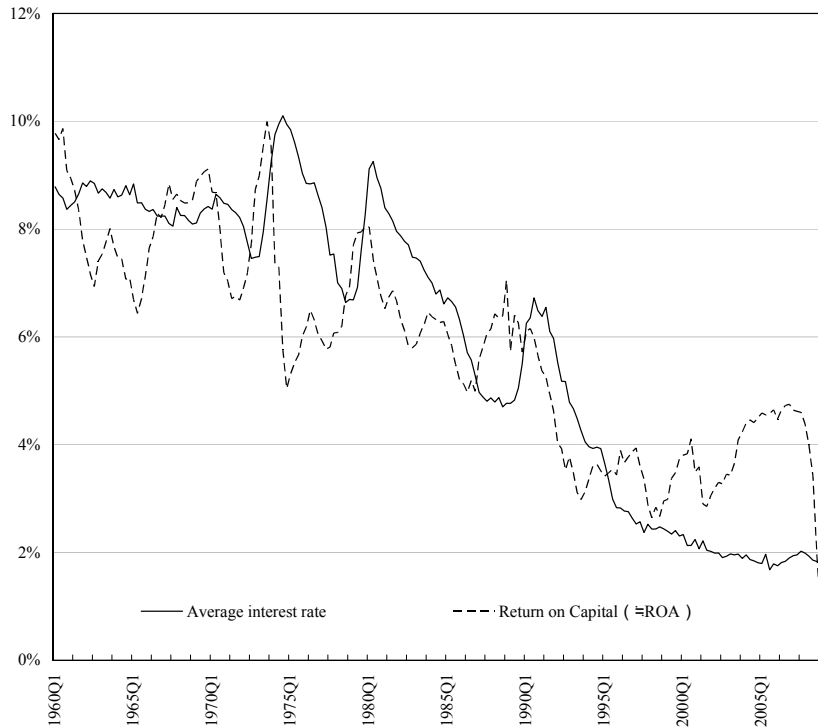
To see the size of the contribution of each factor, we expand the following:

$$\begin{aligned} 1 - \frac{\text{Entrepreneurial Income}}{\text{Operating Surplus}} &= \frac{ie}{\alpha(r-i) + i} \\ d \log \left( 1 - \frac{\text{Entrepreneurial Income}}{\text{Operating Surplus}} \right) &= d \log i + d \log e - d \log [\alpha(r-i) + i] \end{aligned} \quad (4)$$

Figure 12 shows the impact of the contribution of three terms to its left-hand side. The first term represents the effect of loan rate (rising interest rates reduced the entrepreneurial income ratio), the second term the debt ratio (rising debt ratio reduced entrepreneurial income ratio), and the third term difference between borrowing rate and return on capital (rising return on capital rate higher than the borrowing interest rate increased entrepreneurial income ratio). Until 1980s, no major changes in the level of debt ratio, and only the large economic fluctuations such as oil shock

Figure 13

## Average Interest Rate and Return on Capital



Source: Ministry of Finance, *Financial Statements of Corporation Industry*.

of return, actual level of interest rate is strongly influenced by monetary policy. Since 2000, continuing monetary easing has kept borrowing rates much less than real rate of return (Figure 13). In the background, corporate sector has taken the action retaining internal reserves to recover their equity damaged by falling asset prices since the 1990s. Under such circumstances, the recent level of entrepreneurial income ratio has been historically high. This is another factor which has affected recent volatile corporate tax base in Japan.

Considering the analyses in (1) and (2), we conducted a regression analysis which explains the trend of entrepreneurial income by GDP gap and borrowing rates. The result is shown as follows:

$$\log \left( \frac{SNA\_INCOME\_ADJ}{NDPV} \right) = -1.49 + 10.93 \times GAP - 11.08 \times LOAN\_RATE \quad [\text{reg.1}]$$

(-22.96)
(8.29)
(-7.32)

[ $R^2_{\text{adj}}$ =0.805, sample period: 1990-2008,  $t$ -value in parentheses]

where  $SNA\_INCOME\_ADJ$  is entrepreneurial incomes before dividend payments in the SNA, in which inventory valuation and interest payments are adjusted,  $NDPV$  is GDP (in the SNA) excluding capital depreciation, operating surplus and mixed incomes in the household and public corporation sectors,  $GAP$  is GDP gap calculated from the Cobb-Douglass production function and  $LOAN\_RATE$  is the loan interest rate calculated as the ratio of interest payment to loan outstanding in the Financial Statements of Corporation Industry.

had made the difference between borrowing rate and return on capital fluctuate. But economic cycles had canceled out such fluctuation in the long-run and there has not been significant change in entrepreneurial income ratio. In the 1990s the stable relationship between rates of return and borrowing rates has changed. After the surge of the borrowing rates in 1990 and rapid decline, low interest rates continued since 1995. As a result, after the mid-1990s the variations in real rate of return directly lead to the changes in entrepreneurial income ratio.

While the level of interest rates is theoretically expected to be parallel to the real rate

### 4.3 Relation between tax base and entrepreneurial income

Then, we discuss the relation between tax base (incomes of corporations in profit) and entrepreneurial income. Looking at Figure 8, the ratio of the taxable incomes to the corporate incomes fluctuates in the range of 80 to 130 per cent, and the elasticity does not seem stable. The discrepancy is mainly attributed to three factors. The first is the difference in the concept between the taxable incomes and the corporate incomes. While the taxable incomes include value-added produced abroad and the capital gains or losses stemming from asset prices fluctuations, the corporate incomes in SNA data is based on the aggregate of the flows of value-added created in the domestic corporate sector. The second is the influence of the amount of losses of the corporations in deficit (incomes of corporations in deficit). The taxable incomes can be obtained

by adding the incomes of corporations in deficit (which is now defined to be positive) to the net aggregate incomes of all corporations. If the distribution of income depends on business cycles and incomes of corporations in deficit show irregular movements, the relationship between the two becomes unstable. The third is the effects of the deductions of operating losses carried forward.

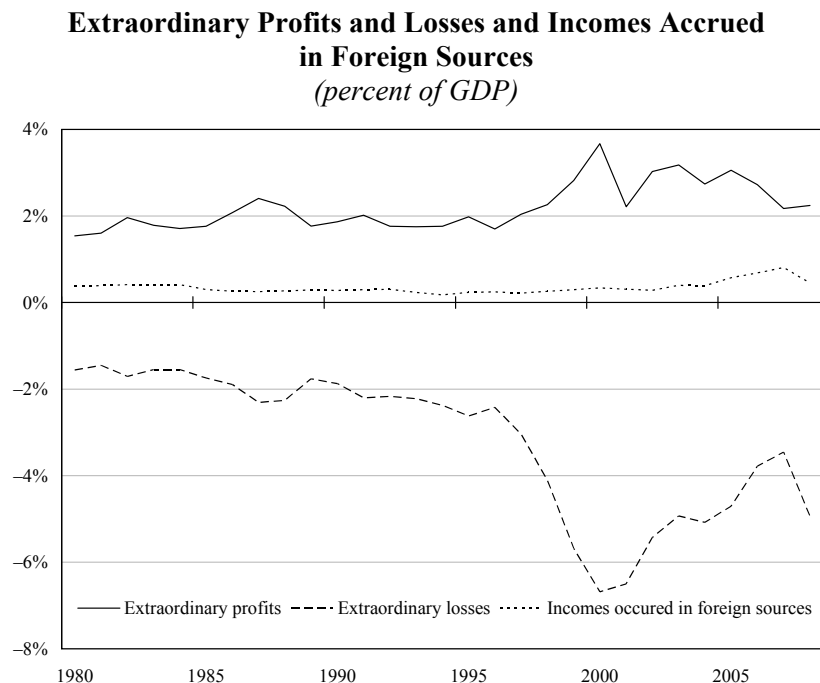
by adding the incomes of corporations in deficit (which is now defined to be positive) to the net aggregate incomes of all corporations. If the distribution of income depends on business cycles and incomes of corporations in deficit show irregular movements, the relationship between the two becomes unstable. The third is the effects of the deductions of operating losses carried forward.

#### 4.3.1 The effects of the difference in the concept

First, as a source of discrepancies between the taxable incomes and the corporate incomes, we can consider the factor of asset prices fluctuations. Specifically, we will analyze them by using the data of extraordinary profits and losses in Financial Statements of Corporation Industry. The transition of the extraordinary profits and losses is shown in Figure 14.

Value-added produced abroad (incomes generated by overseas branches) are not included in entrepreneurial income, but in the taxable incomes.<sup>7</sup> It is of course difficult to identify the amount

**Figure 14**

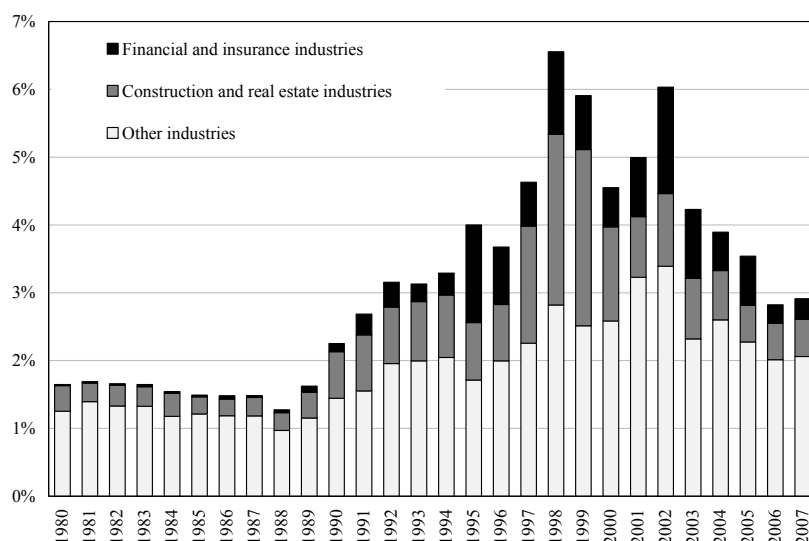


Source: Ministry of Finance, *Fiscal Financial Monthly Report*, National Tax Agency, *Corporation Sample Survey*.

<sup>7</sup> The taxable incomes here are the values before tax deductions. The incomes of residents and domestic corporations are taxed worldwide, and the amounts of taxes payable are calculated. After that, deductions of foreign-levied taxes are applied.

Figure 15

### Incomes of Corporations in Deficit (percent of nominal GDP)



Source: National Tax Agency, *Corporation Sample Survey*.

of incomes generated overseas, however, we try to calculate the amount of incomes accrued in foreign sources by dividing deductions of taxes levied overseas by a certain tax rate, which is also shown in Figure 14. The calculated incomes accrued in foreign sources begin to increase gradually since the early 2000s.

#### 4.3.2 Effects of incomes of corporations in deficit

If the competition among companies can replace the old firms with

the new ones or can make differences in their performance, it seems that a constant fraction of the companies will be in deficit even when the GDP gap is zero. If the ratio of incomes of corporations in deficit to overall corporate incomes is stable over time, we can expect that the overall corporate incomes and the incomes of corporations in positive profit (taxable incomes) may move together. However, in reality, decrease of overall corporate incomes will lead to increase of incomes of corporations in deficit (the mean effect in the distribution), and if shocks of macro economy or of business cycles given to each company are not uniform, it will lead to increase of incomes of corporations in deficit (the variance effect in the distribution). In both cases, the ratio of incomes of corporations in deficit to overall corporate incomes may not be stable.<sup>8</sup>

Looking at the movements of the ratio of incomes of corporations in deficit to nominal GDP (except finance and insurance industry) (Figure 15), incomes of corporations in deficit and entrepreneurial income does not necessarily move in parallel. Since 1990s, incomes of corporations in deficit increased sharply, which can be attributed to three industries; finance and insurance, construction and real estate industries.

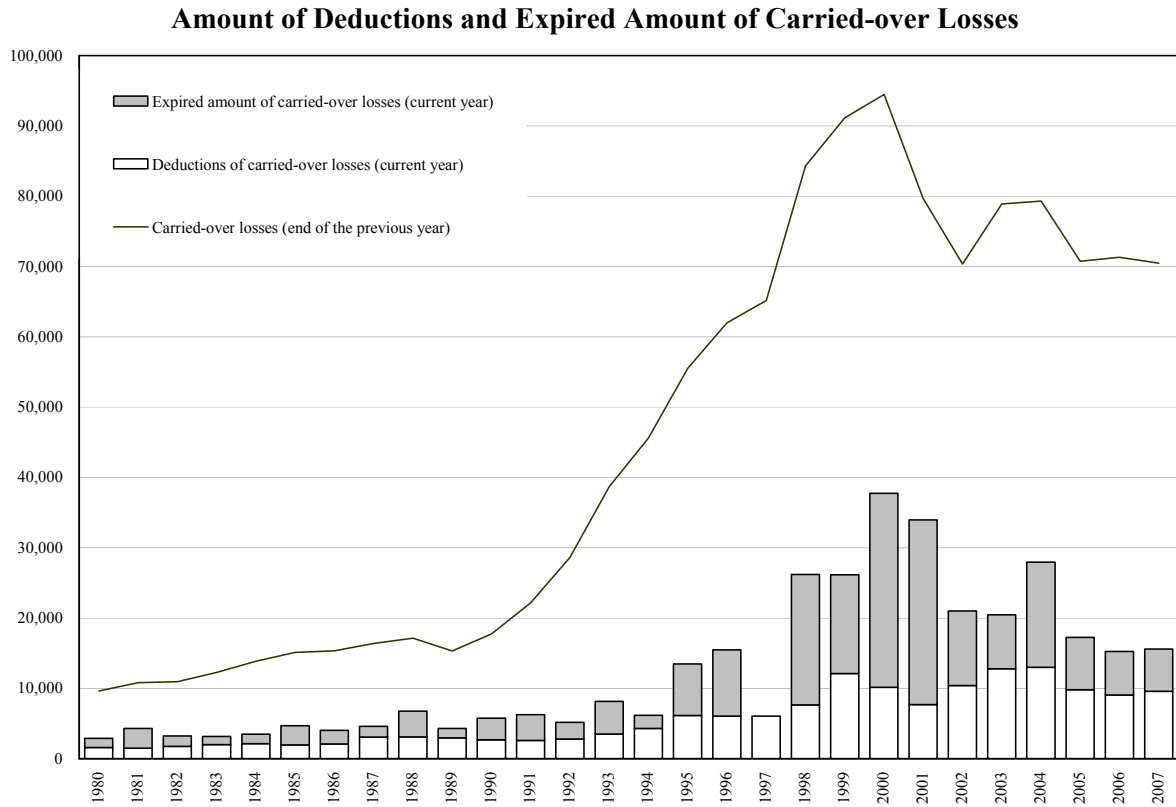
#### 4.3.3 Effects of deductions of operating losses carried forward

Under Japan's corporation tax system, tax deduction of operating losses carried forward is

<sup>8</sup> Explicitly considering the effects of incomes of corporations in deficit, Hori, Suzuki and Kayasono (1998) estimated corporate tax revenues in Japan. In their paper, the relation between the ratio of corporate incomes to nominal GDP ( $y_{cv}/gdp_v$ ) and the ratio of incomes of corporations in deficit to taxable incomes ( $prl/prb$ ) is modeled as the following exponential function ( $a$ : constant), in which a decrease in corporate incomes leads to an increase in incomes of corporations in deficit.

$$\frac{prl}{prb} = a \frac{y_{cv}}{gdp_v}$$

Figure 16



Source: *Corporation Sample Survey* (National Tax Agency)

allowed as an exception of the single-year principle in accounting. It enables companies in deficit to carry forward their losses to the periods of 7 years from the subsequent year, in order not to curb capital accumulations.<sup>9</sup>

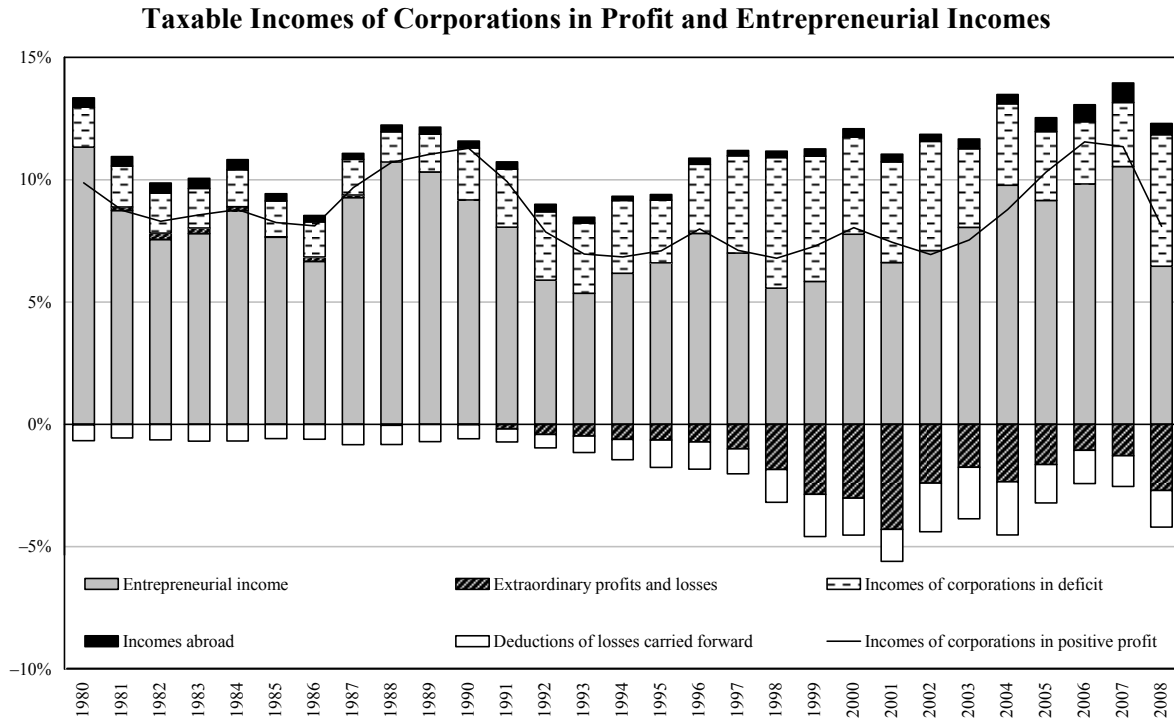
Figure 16 shows the carried-over losses outstanding and the amount of deductions in every year (except finance and insurance industry). Increase of incomes of corporations in deficit since 1990s has led to the expansion of the carried-over losses outstanding and the amount of deductions afterward. On the other hand, in the recent years, the carried-over losses outstanding and the amount of deductions begin to decrease because incomes of corporations in deficit tend to decrease and the carried-over losses begin to expire.<sup>10</sup>

Since the size of deduction of each year depends on the past deficits and level and distribution of the positive profits made in subsequent years, it is difficult to make accurate predictions on the future deductions of operating losses carried over. We conducted a regression analysis that explains how the deficit in a certain year can be deducted in 7 years from the subsequent year by using past actual data.

<sup>9</sup> It is stipulated in the Corporation Tax Law, Article 57. The periods in which deductions of carried-over losses are allowed have been extended from 5 years to 7 years in the tax reform in 2004. The 7-year rule applies to the losses after 1<sup>st</sup> April, 2001 (Corporate Tax Reform Act in 2004, Additional Rule 13.)

<sup>10</sup> Carried-over losses can not be deducted unless the firms earn positive profits that can be offset in the specified periods. Therefore, not all the cumulative amount of losses in the past are offset in future.

Figure 17



Source: Ministry of Finance, *Financial Statements of Corporation Industry*; National Tax Agency, *Corporation Sample Survey*; Cabinet Office: *SNA*.

$$DCO\_EXF = -0.230 \times INRED\_ADJ(-1) \quad [reg.2]$$

(-4.79)

$$- 0.037 \left[ \sum_{j=2}^5 INRED\_ADJ(-j) + D01 \times \sum_{j=6}^7 INRED\_ADJ(-j) \right]$$

(-3.80)

[ $R^2\_adj=0.580$ , sample period: 1987-2008,  $t$ -value in parentheses]

where  $DCO\_EXF$  is deductions of operating losses carried forward in the Corporation Sample Survey (except for finance and insurance industries),  $INRED\_ADJ$  is a proxy variable of incomes of corporations in deficit, which can be inferred from the difference between incomes of corporations in positive profit (which is calculated from general account revenues) and the sum of entrepreneurial incomes, extraordinary profits (losses) and incomes abroad and  $D01$  is a dummy variable that is on after 2001. The number of observations is 30 years, and the result implies that on average 20 per cent of the carried-over losses are deducted in the next year, and roughly half of the losses are deducted for 7 years from the subsequent year, and the remaining losses are expired.<sup>11</sup>

Graphical representation of each factor (a)–(c) is given in Figure 17. The gap between incomes of corporations in positive profit (taxable incomes) and overall corporate incomes can be largely explained by these three factors. It is expressed as follows:

<sup>11</sup> Using the data of Corporation Sample Survey from 1990 to 2007, we calculate the cumulative amount of the expired losses carried forward (carried-over losses in the previous period – deductions in current period + deficit in current period – carried-over losses in the current period). It is roughly the half of the accumulative amount of the deficit in the same period.

Incomes of corporations in positive profit (taxable incomes)

= entrepreneurial income

± extraordinary profits and losses, incomes abroad

+ incomes of corporations in deficit

– deductions of losses carried forward

Looking at Figure 17, it can be seen that a fall in asset prices in the Japan's economy in 1990s led to the expansion of extraordinary losses, which reduced taxable incomes. However, as those effects hit intensively on specific industries (such as real estate industry), not only the expansion of extraordinary losses but also increase in deficit have occurred at the same time. As a result, taxable incomes as a whole did not shrink too much. Since the impact of the decrease of incomes (including the negative effects of asset price) in a macroeconomic level has occurred in the specific sectors, it can be said that the variance of corporate incomes became larger and incomes of corporations in deficit increased.

The regression result of incomes of corporations in deficit is as follows:

$$\begin{aligned} \frac{INRED\_ADJ}{GDPV} = & 0.012 + 0.246 \times |\Delta GAP| - 0.073 \times \left( \frac{SNA\_INCOME\_ADJ}{GDPV} \right) \\ & + 1.017 \times \left( \frac{EXTRA\_LOSS - EXTRA\_PROF}{GDPV} \right) + 0.0073 \times D1990C \end{aligned} \quad [\text{reg.3}]$$

(1.73)      (2.10)      (-0.98)      (9.19)      (2.50)

[ $R^2_{\text{adj}}$ =0.894, sample period: 1981-2008,  $t$ -value in parentheses]

where *EXTRA\_LOSS* and *EXTRA\_PROF* are extraordinary losses and profits in the Financial Statements of Corporation Industry, *D1990C* is a dummy variable that is on after 1990 and other variables are defined in the previous regression results. In order to quantify the movements of incomes of corporations in deficit, we adopt the mean effects (if entrepreneurial income decreases, incomes of corporations in deficit increase), the variance effects (if the GDP gap widens in both directions, incomes of corporations in deficit increase) and factor of extraordinary profits and losses as explanatory variables. As the level of dependent variable (incomes of corporations in deficit) is significantly different before and after 1990, we added the dummy variable that is on after 1990. The regression result implies that extraordinary losses generated in the estimation period increased incomes of corporations in deficit by raising variance of the distribution of corporate incomes, which in fact did not lower the taxable incomes in the current period. If the GDP gap was zero, the ratio of incomes of corporations in deficit to GDP on average after 1990 would be 1.31 and 1.45 per cent with the ratio of corporate incomes to GDP 9 and 7 per cent respectively.

#### 4.4.4 Summary of the discussions in this section

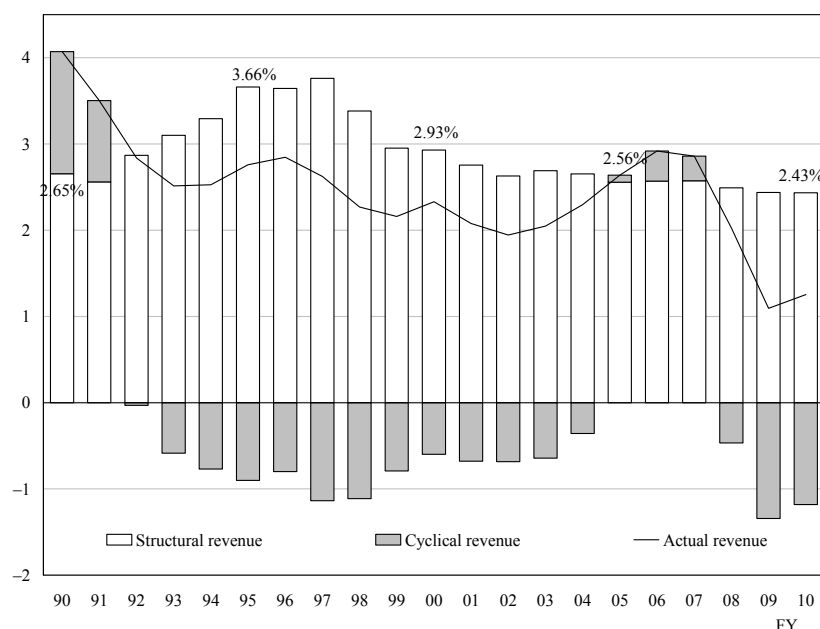
As discussed in this section, there are mainly five factors that can explain the movement of taxable incomes of private non-financial corporations; (1) structural and cyclical changes of the distribution of value-added in the Japanese economy, (2) the relationship between interest rates and return on capital, (3) asset price movements and return on foreign investment, (4) the divergence of economic fluctuations among sectors, and (5) deductions of carried-over losses. In particular, since 1990, due to the changes in these factors, tax revenues and its elasticity to GDP largely fluctuated every year. It should be noted that these factors did not necessarily affect the taxable incomes in only one way.

As for factor (1), in the long run, the declining trend of return on capital resulted in the fall in the ratio of the taxable incomes to GDP. However, in the short run, taxable incomes were largely



Figure 18

**Estimation of the Structural Revenue of Corporate Tax**  
(baseline scenario, percent of GDP)



affected by business cycles. In particular, taxable incomes were temporarily enlarged by economic recoveries.

As for factor (2), under the low interest rate policy regime, the level of taxable incomes in recent years has been historically high. Because a nexus between return on capital and interest rates has not worked well since the mid-1990s, we need to pay attention to the fact that the changes in return on capital have the direct impact on the corporate tax base.

As for factors (3)-(5), as massive

shocks of the bubble burst in the 1990s hit specific sectors, such as construction, retail and real estate industries, the influences of the negative shocks on the corporate tax base was rather limited although the size of the shocks was unprecedentedly large.

It is expected that the global economic downturn triggered by the global financial crisis since 2008 will drive down corporate tax revenues. The primary factor in the short run is a sharp decline of the capital share with the economic downturn; as the negative shocks hit whole of the economy uniformly, sectors with large positive incomes are most affected. Since interest rate is already at very low level, there would be no buffer of abating the burden of interest payments.

## 5 Structural components of the corporate tax revenues

In this section, based on the regression results, we will estimate the level of structural corporate tax revenues in relation to the size of the economy under the current tax system. Estimation results are shown in Figure 18. Concrete estimation procedures are as follows:

- 1) Using [reg.1], the potential series of entrepreneurial income when GDP gap is zero is calculated in each year, with the adjustment of extraordinary profits and losses and incomes accrued in foreign sources.<sup>12</sup>
- 2) Using [reg.3], the potential series of the incomes of corporations in deficit when the GDP gap was zero is calculated.

<sup>12</sup> Extraordinary profits and losses, until 2008, are taken from the actual values in the Financial Statements of Corporation Industry (we assume that the values after 2009 are equal to those in 2008). Incomes accrued in foreign sources, until 2007, are assumed to be equal to the amount of the tax deductions (taken from the Corporations Sample Survey) divided by the average tax rate. Incomes accrued in foreign sources, after 2008, are extended by using the average ratio to tax revenues in 2003-07 (5 years).

- 3) Using [reg.2] and the estimated series of the incomes of corporations in deficit (obtained in (2)), the potential series of the tax deductions for the carried-over losses is calculated.
- 4) Adding the incomes of corporations in deficit in (2) to the adjusted entrepreneurial income in (1), and subtracting the tax deductions for the carried-over losses in (3), we can obtain the potential series of the incomes of corporations in positive profit (taxable incomes).
- 5) The taxable incomes in (4) are multiplied by the actual average rate of corporate tax.

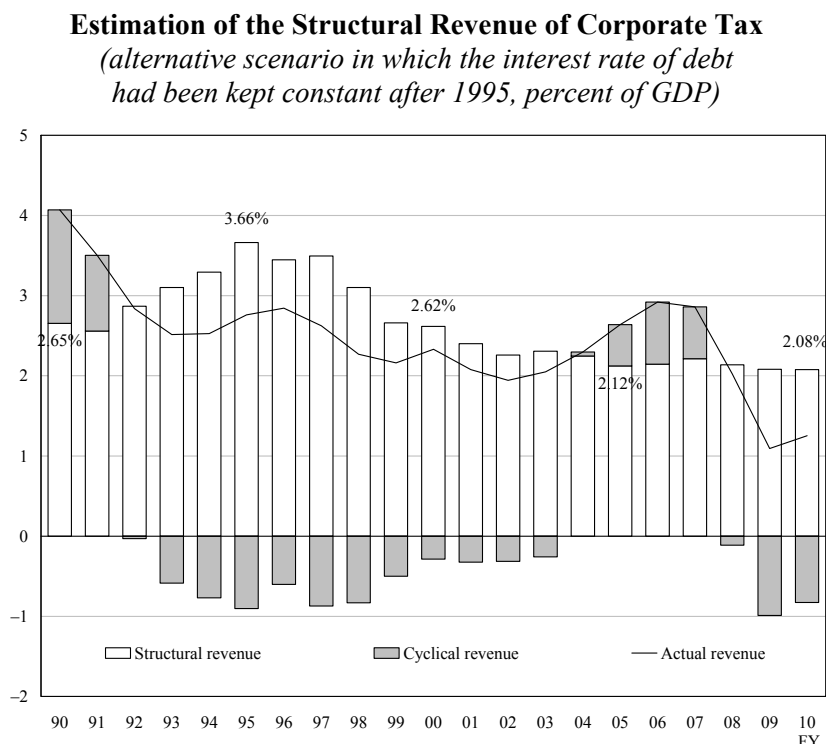
Subsequently, the tax deductions (including the deductions for income taxes, etc.) and corporate tax revenues from financial institutions are adjusted.<sup>13</sup>

The result implies that the potential size of the structural corporate tax revenue in FY 2010 is estimated to be 2.43 per cent of GDP. When we assume the interest rate was constant after 1995 level (without extraordinary low interest rate policy), the structural corporation tax revenue is estimated to be 2.08 per cent of GDP (Figure 19).

Figure 20 shows the virtual series of the structural corporate tax revenues when huge extraordinary losses were zero in the 1990s<sup>14</sup>. Under the current tax system and the level of interest rates at FY1995, the structural corporate tax revenue in FY 2010 is estimated to be 2.39 per cent of GDP, in which we do not consider the effects of tax deductions for carried-over losses generated by the huge extraordinary losses.

Compared with the potential series of the structural corporate tax revenues calculated above, it seems that the actual level of corporate tax revenue in 2006-07, 2.9 per cent of GDP, may exceed the structural level, reflecting a temporal high capital share in the phase of economic recovery. On the other hand, the actual (expected) level of corporate tax revenue in 2010, 1.1-1.3 per cent of GDP, is considerably lower than the level of the structural corporate tax revenue.

Figure 19



<sup>13</sup> The average tax rate, the amount of tax deductions etc. and the corporate tax revenues from the financial institutions, until 2007, are taken from Corporation Sample Survey data. The average tax rate, the corporate tax revenues from the financial institutions, and the income tax deductions, after 2008, are assumed to be equal to those in 2007. The tax deductions excluding the income tax deductions, after 2008, are extended by using the ratio to tax revenues in 2007.

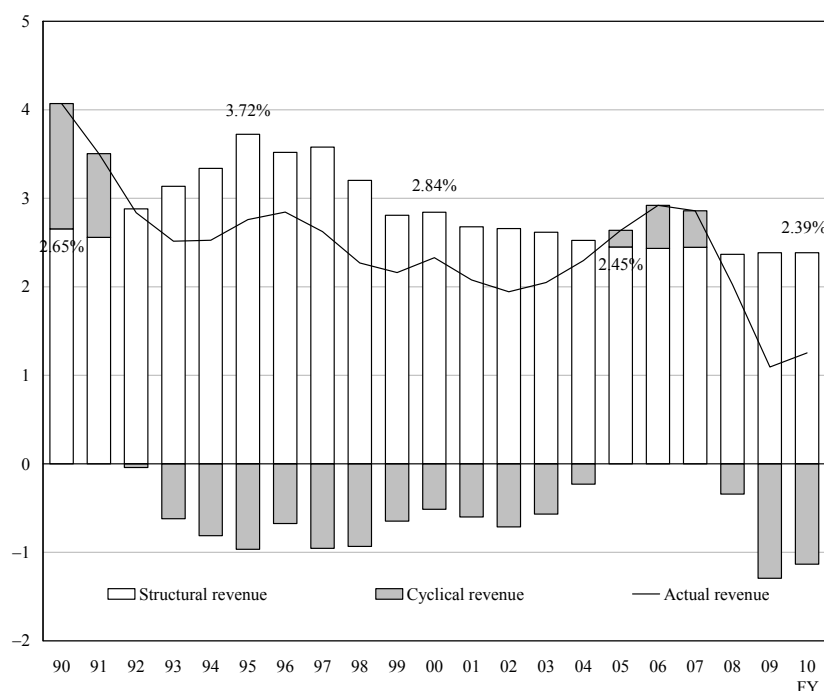
<sup>14</sup> Extraordinary profits and losses (extraordinary profit – extraordinary losses) is virtually assumed to be zero.

## 6 Conclusions

In recent years, the elasticity and the level of corporate tax revenue have fluctuated widely every year because of the sticky movements of compensation of employees, adhesive movements of interest rates compared with the return on capital, economic shocks stemming from asset price fluctuations and macroeconomic shocks given to sectors unevenly. As we have seen in the previous sections, because the magnitude of the impact of each factor greatly varies over time, it is unreasonable to adopt a methodology of estimating the structural corporate tax revenue under the assumption that the elasticity is fixed at a certain level.

**Figure 20**

**Estimation of the Structural Revenue of Corporate Tax**  
(alternative scenario in which the huge amount of extraordinary losses had been zero in the 1990s)



In considering fiscal sustainability, it is essential to have a good knowledge on the structural revenue under the current tax system. Structural corporate tax revenue in the long run is largely determined by the trends in labor and capital share, the trends in the return on capital and interest rates, and the trends in incomes of corporations in deficit. Therefore, it is necessary to assume specific scenarios in the future, to calculate correctly the structural tax revenues obtained under those scenarios, and in the long run to implement appropriate and flexible fiscal management in anticipating the structural tax revenues.

In this paper, under the current tax system and the current

structure of economy in Japan, if we assume that interest rates got on normal paths and the effects of the tax deductions for carried-over losses due to large-scale extraordinary losses vanished, potential level of the structural corporate tax revenue is estimated to be 2.4 per cent of GDP. In addition, if we assume that interest rates continued to be extremely low and the effects large-scale extraordinary losses in the past were counted, potential level of the structural corporate tax revenue is calculated to be almost the same level as the previous case.

However, it is also necessary for us to be aware that, with fluctuations of the economy, the actual tax revenues can temporarily swing up as in 2006-07, can swing down as in 2009-10, or could continue to be below the calculated level of the structural tax revenue if large tax deductions of carried-over losses were realized due to huge extraordinary losses.

This paper has not discussed how tax revenues can fluctuate in the short run. Although there is a limitation to make accurate estimates, it is possible to run a simulation in which we can estimate the structural level of tax revenue in a macro econometric model where GDP gaps and interest rates are endogenously determined and we can also control the speed of convergence to the potential level of tax revenues by adjusting the factors of extraordinary profits and losses. Based on alternative scenarios with a variety of concepts reflecting the Japan's current economic situation and evolution, we can also make a long-term outlook of the structural tax revenues and the economic structures of production and distribution. These are interesting subjects in the future research.

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## OPTIMAL FISCAL POLICY IN THE POST-CRISIS WORLD

*Francesco Caprioli,\* Pietro Rizza\* and Pietro Tommasino\**

*To contrast the severe global recession of 2009, governments in most advanced countries implemented expansionary fiscal policies leading to a steep increase in public debt. As economies recover, a critical choice is whether to stabilize debt at post-crisis levels, or to bring it down to pre-crisis levels. On this issue, advices of international institutions and those coming from mainstream economic theory are at odds. While international institutions have called for a substantial and fast debt reduction, optimal fiscal policy literature calls for debt stabilization. The aim of this paper is to provide a formal theoretical rationale to the policy advices of international institutions in a DSGE model (the workhorse of mainstream optimal fiscal policy theory). In particular, we consider a model in which a benevolent government has to choose taxes and debt in order to finance an exogenous stream of public expenditure. We compare the optimal fiscal plan in two contexts. In the first one households are fully confident about government solvency. In the second, households believe that there is a positive default probability which is positively related to the level of debt. While in the first framework a temporary bad shock translates into a permanent increase in the debt level, in the second one the increase in government debt is only temporary.*

*“Only thing we have to fear is fear itself.” F.D. Roosevelt*

### 1 Introduction

To contrast the severe global recession of 2009, governments in most advanced countries implemented expansionary fiscal policies. These interventions have led to a steep increase in debt levels. According to the IMF, in the advanced economies of the G20 the debt-to-GDP ratio is projected to rise from 78 in 2007 to 118 per cent in 2014. While it is clear that ever-increasing debt-to-GDP ratios are inconsistent with government solvency and have to be avoided, a critical policy choice confronting policy-makers is whether to stabilize debt ratios at current levels, or bringing them down to pre-crisis levels. On this issue, advices of international institutions and those coming from mainstream economic theory are at odds.

On one side, international institutions have called for a substantial and fast debt reduction. For example, the December 2009 issue of ECB’s *Monthly Bulletin* calls for adjustment measures which “succeed in putting debt ratios on a declining trajectory”, to be implemented in 2011 at the latest; the ECOFIN Council (October 2009) agrees that “beyond the withdrawal of the stimulus measures, substantial fiscal consolidation is required in order to halt and eventually reverse the increase in debt”; the European Commission’s *Communication from the Commission to the European Parliament and the Council: “Long-term Sustainability of Public Finances for a Recovering Economy”*, 2009, while recognizing that “a one-off increase in the stock of government debt need not put sustainability at risk”, stresses that “while, prior to the crisis, the three prongs of the (Stockholm) strategy [*i.e.*, deficit and debt reduction, increases in employment rates and reforms of social protection systems] were options from which countries could choose, each of

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these pillars is now indispensable for most EU countries”; the IMF’s *Strategies for Fiscal Consolidation in the Post-crisis World*, 2010, argues that “stabilizing debt ratios at post-crisis level would be insufficient”.

On the other side, a surprisingly robust result in optimal fiscal policy theory is that public debt should on average be constant.<sup>1</sup> This has been demonstrated to be true both in a complete market framework (*i.e.*, in a framework in which the government has access to a full array of bonds for each maturity and for each contingency<sup>2</sup>) and in a more realistic incomplete market framework. In this latter setup, Ayagary, Marcet, Sargent and Seppälä (2002), “Optimal Fiscal Policy without State Contingent Debt”, *Journal of Political Economy*, rigorously confirm the intuition of Barro (1979), “On the Determination of Public Debt”, *Journal of Political Economy*, that negative shocks should have a permanent effect on public debt.<sup>3</sup> More precisely, the authors demonstrate that the optimal fiscal policy requires the debt to follow a random walk process, *i.e.*, its level tomorrow and in any future period is equal in expected terms to today’s level. These results are also robust to the introduction of capital (see, *e.g.*, Chari, Christiano and Kehoe (1994), “Optimal Fiscal Policy in a Business Cycles Model”, *Journal of Political Economy*; Chari and Kehoe (1999), “Optimal Fiscal and Monetary Policy”, in *Handbook of Macroeconomics*; and Scott (1999), “Does Tax Smoothing Imply Smooth Taxes”, CEPR, Discussion Paper, No. 2172).

In summarizing this wide body of literature, Scott (2009), “Government Debt After the Crisis” concludes that economic theory suggests that “in the wake of large adverse shocks... the optimal response is to use debt as a buffer stock. Debt should show large and long term shifts and there is no presumption that governments need to reduce debt to pre-crisis levels”. And that, in any case, “... fluctuations in government debt after such adverse shocks are long lasting... Debt stabilization occurs over decades not within a decade”.

Is it possible to make sense of the policy advices of international institutions and practitioners in a model which shares features of the neoclassical dynamic general equilibrium models, which are the workhorse of standard optimal fiscal policy theory? The aim of this paper is to answer this question.

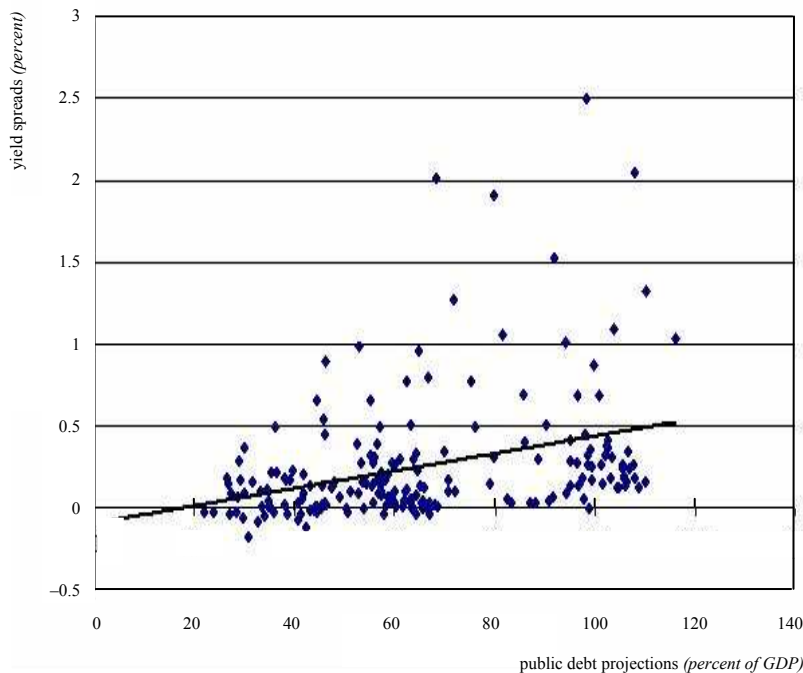
As in Ayagary *et al.* (2002), we consider a closed production economy with no capital and infinitely lived agents. Public spending follows an exogenous stochastic process. The problem of the representative household is to maximize its lifetime expected utility subject to the flow budget constraint. The government is benevolent: it chooses the level of debt and distortionary taxes on labor income to maximize households’ expected utility subject to the feasibility constraint, households’ beliefs and optimality conditions and debt sustainability. Moreover, the government acts under full commitment, *i.e.*, it always fulfils its promises. We believe that these two

<sup>1</sup> The optimal taxation literature is immense and offering a comprehensive survey goes beyond the scope of this paper. See Barro, R.J. (1979), “On the Determination of Public Debt”, *Journal of Political Economy*; Barro, R.J. (1989), “The Neoclassical Approach to Fiscal Policy”, published in *Modern Business Cycle Theory*, Harvard University Press; Barro, R.J. (1995), “Optimal Debt Management”, NBER, Working Paper, No. 5327; Barro, R.J. (1997), “Optimal Management of Indexed and Nominal Debt”, NBER, Working Paper, No. 6197; Bohn, H. (1990), “Tax Smoothing with Financial Instruments”, *American Economic Review*, No. 80; Kydland, F. and E.C. Prescott (1980), “Dynamic Optimal Taxation, Rational Expectations and Optimal Control”, *Journal of Economic Dynamics and Control*; Lucas, R.E. Jr. and N.L. Stokey (1983), “Optimal Fiscal and Monetary Economy in an Economy Without Capital”, *Journal of Monetary Economics*; Chari, V.V., L.J. Christiano and P.J. Kehoe (1994), “Optimal Fiscal Policy in a Business Cycles Model”, *Journal of Political Economy*; Chari, V.V. and P.J. Kehoe (1999), “Optimal Fiscal and Monetary Policy”, in *Handbook of Macroeconomics*; Ayagary, R., A. Marcet, T.J. Sargent and J. Seppälä (2002), “Optimal Fiscal Policy Without State Contingent Debt”, *Journal of Political Economy*; Zhu, X. (1992), “Optimal Fiscal Policy in a Stochastic Growth Model”, JET, among many others.

<sup>2</sup> Lucas, R.E. Jr. and N.L. Stokey (1983), “Optimal Fiscal and Monetary Economy in an Economy Without Capital”, *Journal of Monetary Economics*.

<sup>3</sup> See also Marcet, A. and A. Scott (2010), “Debt and Deficit Fluctuations and the Structure of Bonds Markets”, JET.



**Figure 1****Debt Level and Yield Spread**

assumptions are quite plausible if referred to advanced economies, in which the political cost of a default is likely to be prohibitive. Nevertheless, we also assume that households believe that with a positive probability the government could default on its own debt. This assumption captures the current situation, in which we observe financial markets assigning significant default probabilities even to the sovereign debt of advanced countries. For example, Figure 1 points to a positive relation between the amount of government debt and yield spread, a proxy for the sovereign risk premium, for 10 euro area countries in the period 2000-09. So we

assume that households believe that there is a positive relation between the probability of default and the amount of outstanding debt. Over time they update their estimates of this relation as new data on government behavior become available.

We study the impact of expectations about government default on the optimal fiscal policy in two different set-ups. In the first one, when in the initial period the fiscal authority sets its plans agents are already sceptical about the government capability/willingness to honor its debt obligations. In the second one, agents are instead fully confident about debt repayment, but they may start fearing default if the government uses debt to absorb an adverse shock. These two cases are meant to capture two different situations. The first one refers to the post crisis situation, characterized by high debt levels and significant sovereign risk premia: here the government's problem is to design an optimal "exit strategy". The second one instead is meant to capture both the pre-crisis and the post-crisis period (crisis is modelled here as a very high decrease in productivity and output). The main problem here is to understand whether a "fiscal stimulus" in times of crisis, implying higher deficits and debts, is consistent with an optimal fiscal plan.

Our main findings are the following. First, when agents fear government default, a post-crisis fiscal consolidation becomes optimal. The intuition is that the interest rate on government debt is too high due to distorted expectations about government default. Therefore the marginal cost of higher distortionary taxes today is more than compensated by the expected future marginal benefits of lower distortionary taxes tomorrow. The incentive to reduce debt is stronger i) the more pessimistic agents are about government solvency and ii) for a given degree of pessimism, the higher the post-crisis debt level. Second, the state of agents' initial beliefs has an effect on the long-run mean value of the tax rate and debt. Third, while optimality still requires to increase debt

to absorb the negative shock (as in Ayagary *et al.*, 2002), the possibility of a negative shock leads the government to run much higher primary surpluses before it materializes. *i.e.*, to create “fiscal room” in advance.

The paper proceeds as follows. Section 2 characterizes the optimal fiscal policy, and in Section 3 we solve it numerically. In Section 4 we characterize the fiscal plan in the case of an unexpected adverse shock. In Section 5 we compare the fiscal variables dynamics in two countries which differ for their initial debt level. Section 6 concludes.

## 2 The model

We consider an infinite horizon economy with an infinitely lived representative consumer and a benevolent fiscal authority. The government finances an exogenous stream of public consumption levying a proportional tax on labor income and issuing a one-period non state-contingent bond, which is the only financial asset in the economy. The government has a full commitment technology and always repays its debt. There are two sources of aggregate uncertainty, represented by a government expenditure shock and a technology shock. In Subsection 1 we briefly review optimal fiscal policy under the assumption that households are at any moment fully confident about government solvency, as in Ayagary *et al.* (2002). In Subsection 2 we modify this benchmark model assuming that households assign a positive probability to the event of government default. We show how the way in which households form their expectations change the constraints faced by the fiscal authority and consequently the optimal fiscal policy.

### 2.1 The rational expectations benchmark

Time is discrete and indexed by  $t=0,1,2,\dots$ . At the beginning of each period there is a realization of a stochastic state  $s = (g_t, \vartheta_t) \in S = G \times \Theta$ . Let us define the history of events up to time  $t$  as  $s^t = (g^t, \vartheta^t)$ , where  $g^t = (g_0, g_1, \dots, g_t)$ ,  $\vartheta^t = (\vartheta_0, \vartheta_1, \dots, \vartheta_t)$ , and the conditional probability of  $s^t$  given  $s^0$  as  $\pi(s^t | s^0)$ ;  $s_0$  is non-stochastic.

#### 2.1.1 The private sector

A representative household is endowed with one unit of time which can be used for leisure,  $l_t$ , or labor,  $n_t$ .

$$n_t(s^t) + l_t(s^t) = 1 \quad \forall t \geq 0, \quad \forall s^t \in S^t \quad (1)$$

He chooses consumption  $c_t(s^t)$ , leisure and bond holdings  $b_t(s^t)$  to maximize his lifetime discounted expected utility:

$$E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t) = \sum_{t=0}^{\infty} \sum_{s^t} \beta^t u(c_t(s^t), l_t(s^t)) \pi(s^t | s_0) \quad (2)^4$$

subject to the period-by-period budget constraint:

$$b_{t-1}(s^{t-1}) + (1 - \tau_t(s^t))w_t(s^t)(1 - l_t(s^t)) = c_t(s^t) + p_t(s^t)b_t(s^t) \quad (3)$$

<sup>4</sup> The utility function satisfies the usual standard assumptions, *i.e.*,  $u_{c,t} > 0$ ,  $u_{l,t} > 0$ ,  $u_{cc,t} < 0$ ,  $u_{ll,t} < 0$ .

where  $\beta$  is the discount factor,  $\tau_t(s^t)$  is the state-contingent labor tax rate,  $w_t(s^t)$  is the wage rate and  $p_t(s^t)$  is the price of the one period bond.

The household's optimality conditions are:

$$\frac{u_{l,t}(s^t)}{u_{c,t}(s^t)} = w_t(s^t)(1 - \tau_t(s^t)) \quad (4)$$

$$p_t(s^t) = \beta E_t \frac{u_{c,t+1}(s^{t+1})}{u_{c,t}(s^t)} \quad (5)$$

where, for notational simplicity, we denote from now on  $u_{c,t}(s^t)$  and  $u_{l,t}(s^t)$  as the marginal utility of labor and consumption in state  $s^t$ .

There is only one non-storable good, produced by a representative price-taker firm with a linear production technology given by:

$$y_t(s^t) = \vartheta_t(s^t)n_t(s^t)$$

Output,  $y_t$ , can be used either for private consumption or public consumption ( $g_t$ ). Equilibrium in the good market and in the labor market requires:

$$y_t(s^t) = c_t(s^t) + g_t(s^t) \quad (6)$$

$$\vartheta_t(s^t) = w_t(s^t) \quad (7)$$

### 2.1.2 The government

The government finances the exogenous sequence of government expenditures levying taxes and issuing debt. Its policy  $\tau_t(s^t), b_t(s^t) \forall t \geq 0$  satisfies the period by period budget constraint:

$$b_{t-1}(s^{t-1}) + g_t(s^t) = \tau_t(s^t)w_t(s^t)(1 - l_t(s^t)) + p_t(s^t)b_t(s^t)$$

The initial level of debt  $b_{-1}$  is exogenously given. Ayagary *et al.* (2002) show that the dynamic optimal taxation problem of the government is equivalent to the problem of maximizing:

$$E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t) \quad (8)$$

under the following constraints:

$$E_0 \sum_{t=0}^{\infty} \beta^t (u_{c,t}c_t - u_{l,t}(1 - l_t)) = u_{c,0}b_{-1} \quad (9)$$

$$E_t \sum_{j=0}^{\infty} \beta^j (u_{c,t+j}c_{t+j} - u_{l,t+j}(1 - l_{t+j})) = u_{c,t}b_{t-1}(s^{t-1}) \quad \forall t \geq 0, \quad \forall s^t \quad (10)$$

$$\underline{M} < \frac{E_t \sum_{j=0}^{\infty} \beta^j (u_{c,t+j}c_{t+j} - u_{l,t+j}(1 - l_{t+j}))}{u_{c,t}(s^t)} < \overline{M} \quad \forall t \geq 0, \quad \forall s^t \quad (11)$$

$$\vartheta_t(1 - l_t(s^t)) = c_t(s^t) + g_t(s^t) \quad (12)$$

Constraints (9) and (10) require that for any period and any state, the inherited level of debt is equal to the stream of expected future primary surpluses. They are equivalent to the intertemporal consumer budget constraint with both prices and taxes replaced using the households' optimality conditions, (4) and (5). If financial markets were complete, constraints (10) would be satisfied by choosing appropriately the vector of state-contingent bond, so they would not constrain the optimal choice of taxes. However, under incomplete markets, the government cannot adjust the inherited stock of debt in response to the current realization of the shock. Therefore, constraints (10) captures the idea that in any period the future path of taxes depends on the current state. Constraints (11) requires that debt limits be respected.

It can be shown that the solution to the government problem satisfies:

$$\tau_t = T(s_t, \psi_{t-1}, b_{t-1}) \quad \forall t > 0 \quad (13)$$

$$b_t = D(s_t, \psi_{t-1}, b_{t-1}) \quad \forall t > 0 \quad (14)$$

Equations (13) and (14) are the optimal policy rules for the labor tax rate and for bond holdings respectively. Both of them are time invariant functions of the current state  $s_t$ , the inherited bond holding  $b_{t-1}$  and the auxiliary state variable  $\psi_{t-1}$  which is equal to the sum of past lagrange multipliers, from period 0 till  $t-1$ , associated to the intertemporal budget constraints (10).<sup>5</sup>

Two observations are worth noting. First, by including the costate variable  $\psi_{t-1}$  in the vector of state variables the problem becomes recursive and standard solution techniques can be applied. Second, the presence of  $\psi_{t-1}$  and  $b_{t-1}$  makes the allocation and the cost of distortionary taxation state and history-dependent.

## 2.2 Modeling fear of government default

In the benchmark model of Subsection 2.1 households fully understand the government problem and therefore attach zero probability to the event of a government default, whatever the observed evolution of government debt. In particular, as households understand the risk-free nature of government bonds, they do not require to be compensated for any default risk. In this section we study what happens if agents abruptly – and wrongly – start to fear that the government might not fulfil the promise of always paying back its own obligations.

In particular, at time  $t$  the household believes that at time  $t+1$  debt will be honoured with probability  $\hat{\pi}_t$  and will be instead repudiated with probability  $(1 - \hat{\pi}_t)$ .

In this case, the optimality condition of the household is given by:

$$\begin{aligned} p_t(s^t, \delta^t) u_{c,t}(s^t, \delta^t) &= \beta \sum_{s^{t+1}} u_{c,t+1}(s^{t+1}, \delta_{t+1} = 1, \delta^t) \tilde{\pi}(s^{t+1}, \delta_{t+1} = 1, \delta^t | s^t, \delta^t) = \\ &= \beta \sum_{s^{t+1}} u_{c,t+1}(s^{t+1}, \delta_{t+1} = 1, \delta^t) \hat{\pi}(s^{t+1} | s^t, \delta^t) \hat{\pi}_t \end{aligned} \quad (15)$$

where  $\delta_t \in \{0,1\}$  is equal to 1 if the government does not default on debt in period  $t$  and equal to 0 otherwise, and  $\hat{\pi}_t$  is the probability that  $\delta_{t+1} = 1$  conditional on  $s^t$  and  $\delta^t$ . The relevant expectations ( $\tilde{\pi}$ ) are now with respect to  $s^t$  and the event of government default.

<sup>5</sup> This approach has been pioneered by Marcet and Marimon (2002).

We make two assumptions about how default expectations evolve. First, the higher the level of outstanding debt, the stronger the fear of government default, and in particular fear of default start to arise when the debt goes above some “psychological” threshold  $\bar{b}$ .<sup>6</sup>

$$\hat{\pi}_t = \frac{1}{1 + \alpha_t \max(b_t - \bar{b})} \quad (16)$$

Second, we assume that agents revise their beliefs about the probability of a public default as new evidence about government behaviour becomes available. In the literature various ways have been proposed to model agents’ learning.<sup>7</sup> We adopt the approach pioneered by Marcet and Sargent (1989). They study agents which are similar to an econometrician, *i.e.*, in each period they estimate recursively those parameters which are relevant for their decision, and whose values they ignore. In our model the only parameter that has to be estimated is  $\alpha$ . Let  $\alpha_t$  be the agents’ estimate of  $\alpha$  at time  $t$ . If agents use a constant gain algorithm with gain parameter equal to  $k$ , a special case of the algorithm studied by Marcet and Sargent (1989),<sup>8</sup> it can be shown that  $\alpha_t$  is given by the following expression:

$$\alpha_t = \alpha_{t-1} (1 - kb_{t-1}^2)^9 \quad (17)$$

Several observations are worth-noting. First, equation (16) nests the rational expectation case in which households understand that default cannot happen. In fact, when  $\alpha_t = 0$ ,  $\hat{\pi}_t = 1$ . Second, under the condition that  $|1 - kb_{t-1}^2| < 1$  equation (17) is such that  $\alpha_t$  converges to its true value, 0.

It is important to stress the fact that the perceived default probability has no impact on the actual default probability, which is always equal to 0. We believe that these features of the model capture the challenges that advanced countries are facing in the aftermath of the huge fiscal stimulus packages put in place to contrast the recent crisis. More generally we aim to derive optimal strategies for policymakers which do not see default as a viable policy option but have to take into account the link between the design of fiscal policy, default expectations and macroeconomic variables.

### Definition 1

Given  $b_{-1}$  and a stochastic process for the government expenditure  $g_t$  and the technology shock  $v_t^g$ , a competitive equilibrium is an allocation  $\{c_t, l_t, g_t\}_{t=0}^{\infty}$ , state-contingent beliefs about government default probabilities  $\{\hat{\pi}_t\}_{t=0}^{\infty}$ , a price system  $\{p_t, w_t\}_{t=0}^{\infty}$  and a government policy  $\{\tau_t, b_t\}_{t=0}^{\infty}$  such that (a) given the price system, the beliefs and the government policy the

<sup>6</sup> In the remaining of the paper, we set  $\bar{b} = 0$ , without loss of generality.

<sup>7</sup> For a comprehensive survey of learning models, see Evans and Honkapohja, (2001). Several papers have already used these models to explain real world phenomena. For example, Adam *et al.* (2006), Carceles and Giannitsarou (2007), and Cogley and Sargent (2008) introduce boundedly rational agents in a standard consumption based asset pricing model to fit some features of asset prices. Marcet and Nicolini (1998) and Adam *et al.* (2005) show how learning can be an explanation of hyperinflationary episodes. Kurz *et al.* (2005), Beaudry and Portier (2004, 2007), and Eusepi and Preston (2008) stress the importance of shifting expectations for business cycle fluctuations.

<sup>8</sup> In any case, the economic intuition behind the result is robust to alternative learning scheme.

<sup>9</sup> This formula is derived in the following way. Assume  $b_t > 0$ . Taking log of equation equation 17 we get  $0 \approx -\alpha_t b_t$  where we use the fact that because of the assumption that government always honours its debt  $\hat{\pi}_t$  tends to 1 and that  $\log(1+x) \approx x$  for small  $x$ .

households' optimality conditions are satisfied; (b) given the allocation and the price system the government policy satisfies the sequence of government budget constraint (3); and (c) the goods and the bond markets clear.

Define:

$$A_t \equiv \prod_{k=0}^t \hat{\pi}_{k-1} \quad (18)$$

In the full credibility case  $A_t$  is constant and always equal to 1, while under learning it is not, unless the initial beliefs coincide with the rational expectations ones, *i.e.*, unless  $\alpha_{-1} = 0$ . Using households' optimality conditions to substitute out prices and taxes from the government budget constraint, Ayagary *et al.* (2002) show the constraints that a competitive equilibrium imposes on allocations. Using a similar argument, we show that under incomplete markets and bounded rationality the following result holds.

#### Proposition 1

Assume that for any competitive equilibrium  $\beta^t A_t u_{c,t} \rightarrow 0$  almost surely. Given  $b_{-1}$  and  $\alpha_{-1}$ , a feasible allocation  $\{c_t, l_t, g_t\}_{t=0}^{\infty}$  is a competitive equilibrium if and only if the following constraints are satisfied:

$$E_0 \sum_{t=0}^{\infty} \beta^t A_t (u_{c,t} c_t - u_{l,t} (1 - l_t)) = A_0 u_{c,0} b_{-1} \quad (19)$$

$$E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} (u_{c,t+j} c_{t+j} - u_{l,t+j} (1 - l_{t+j})) = A_t u_{c,t} b_{t-1} \quad (20)$$

$$\underline{M} < \frac{E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} (u_{c,t+j} c_{t+j} - u_{l,t+j} (1 - l_{t+j}))}{A_t u_{c,t} (s^t)} < \overline{M} \quad (21)$$

with initial condition  $A_{-1} = 1$ .

#### Proof

We relegate the proof to the Appendix.

Equation (20) is the bounded rationality version of the intertemporal constraint on the allocation derived by Ayagary *et al.* (2002) in a rational expectations framework, given in equation (20). The difference between equations (20) and (10) arises through the effect that government default expectations exert on bond prices. As expectations are not model-consistent, the primary surplus at time  $t$ , expressed in terms of marginal utility of consumption, is weighted by the product of one minus the expected default probabilities from period 0 till period  $t$ .

### 2.3 The government problem

Using the so-called primal approach to taxation, we can recast the problem of choosing taxes and bond holdings as a problem of directly choosing allocations of consumption and labor, under the constraint that they satisfy the conditions for a competitive equilibrium.

At this point a clarification is needed. When the households and the benevolent government share the same information, they maximize the same objective function. But when the way in which they form their expectations differ, as in this setup, their objective functions differ as well. In what follows we assume that the fiscal authority maximizes the representative consumer's welfare *as if* the latter were rational. Said differently, the government understands how agents behave and form their beliefs, and it understands that these beliefs are distorted.<sup>10</sup>

### Definition 2

The government problem under learning is:

$$\max_{\{c_t, l_t, \alpha_t, A_{t+1}, b_t\}_{t=0}^{\infty}} E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t)$$

subject to:

$$E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} (u_{c,t+j} c_{t+j} - u_{l,t+j} (1 - l_{t+j})) = A_t(s^t, \delta^t) u_{c,t}(s^t, \delta^t) b_{t-1}(s^{t-1}, \delta^{t-1}) \quad (22)$$

$$\underline{M} < \frac{E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} (u_{c,t+j} c_{t+j} - u_{l,t+j} (1 - l_{t+j}))}{A_t(s^t, \delta^t) u_{c,t}(s^t, \delta^t)} < \overline{M} \quad (23)$$

$$A_{t+1} = A_t \hat{\pi}_t(s^t, \delta^t) \quad (24)$$

$$\alpha_t(s^t, \delta^t) = \alpha_t(s^{t-1}, \delta^{t-1}) (1 - k b_{t-1}^2(s^{t-1}, \delta^{t-1})) \quad (25)$$

$$c_t(s^t, \delta^t) + g_t = \vartheta_t(1 - l_t(s^t, \delta^t)) \quad (26)$$

for given  $b_{-1}$  and  $\alpha_{-1}$ . Equations (22) and (21) constrain the allocation to be chosen among competitive equilibria. Equation (24) is the recursive formulation for  $A_t$  obtained directly from equation (18). Equation (25) gives the law of motion of beliefs. Equation (26) is the resource constraint. As in equations (22) and (21) appear expectations of future control variables, the problem is not recursive and standard solution techniques cannot be used.

The Lagrangian for the Ramsey problem can be represented as:

$$L = E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t) + \psi_t A_t (u_{c,t} c_t - u_{l,t} (1 - l_t)) - \lambda_t b_{t-1} A_{t-1} u_{c,t} + \gamma_t (A_{t+1} - A_t \hat{\pi}_t) + \rho_t (\alpha_t - \alpha_{t-1} (1 - k b_{t-1}^2)) + \nu_t (\vartheta_t (1 - l_t) - c_t - g_t)$$

where  $\psi_t = \psi_{t-1} + \lambda_t - \varepsilon_{1,t} + \varepsilon_{2,t}$ , where  $\beta^t \varepsilon_{1,t}$  and  $\beta^t \varepsilon_{2,t}$  are the Lagrange multipliers attached to the upper and lower debt constraints respectively. Since  $A_t$  and  $\alpha_t$  have a recursive structure, the problem becomes recursive adding  $A_t$  and  $\alpha_{t-1}$  as endogenous state variables to the ones in the Ayagary *et al.* (2002) model, which are  $\psi_{t-1}$  and  $b_{t-1}$ .

<sup>10</sup> The same assumption is made in Karantouniais *et al.* (2010) and Caprioli (2009).

First order necessary conditions  $\forall t > 0$  are:<sup>11</sup>

$\partial c_t :$

$$u_{c,t} + \psi_t A_t (u_{cc,t} c_t + u_{c,t}) - \lambda_{1,t} b_{t-1} u_{cc,t} A_t = v_t \quad (27)$$

$\partial l_t :$

$$u_{l,t} + \psi_t A_t (u_{ll,t} - u_{ll,t} (1 - l_t)) = \vartheta_t v_t \quad (28)$$

$\partial \alpha_{t+1} :$

$$\rho_t - \beta E_t \rho_{t+1} (1 - k b_t^2) + \gamma_t A_t \frac{b_t}{(1 + \alpha_t b_t)^2} = 0 \quad (29)$$

$\partial b_t :$

$$-\beta E_t \lambda_{1,t+1} u_{c,t+1} A_{t+1} + \gamma_t A_t \frac{\alpha_t}{(1 + \alpha_t b_t)^2} + 2\beta E_t \rho_{t+1} \alpha_t k b_t = 0 \quad (30)$$

$\partial A_{t+1} :$

$$\gamma_t - \beta E_t \gamma_{t+1} \frac{1}{(1 + \alpha_{t+1} b_{t+1})} - \beta E_t \lambda_{1,t+1} b_t u_{c,t+1} + E_t \psi_{t+1} (u_{c,t+1} c_{t+1} - u_{l,t+1} (1 - l_{t+1})) = 0 \quad (31)$$

### 3 Numerical solution

Together, the first order conditions and the constraints of the government program imply a stochastic non linear system of difference equations in the variables  $c_t, l_t, \tau_t, b_t, \psi_t, A_{t+1}$  and  $\alpha_t$ . We solve the system using standard collocation methods both in the case in which there are no doubts about debt repayment and in the case in which agents start to fear a government default. In both cases we consider a truncated AR(1) process for government expenditure and labor productivity:

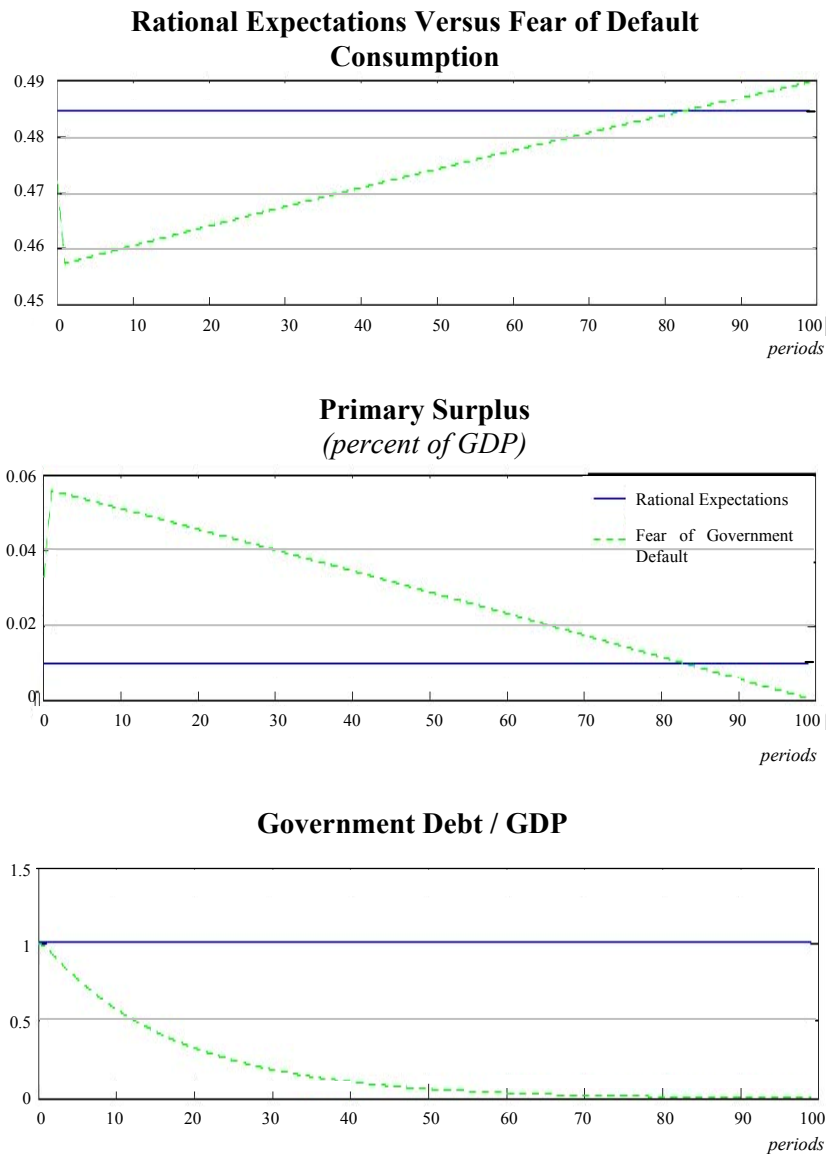
$$g_t = \begin{cases} \underline{g} & \text{if } (1 - \rho_g) g^{ss} + \rho g_{t-1} + \varepsilon^g_t < \underline{g} \\ (1 - \rho_g) g^{ss} + \rho g_{t-1} + \varepsilon^g_t & \text{if } \underline{g} < (1 - \rho_g) g^{ss} + \rho g_{t-1} + \varepsilon^g_t < \bar{g} \\ \bar{g} & \text{if } \bar{g} < (1 - \rho_g) g^{ss} + \rho g_{t-1} + \varepsilon^g_t \end{cases} \quad (32)$$

where  $\varepsilon^g_t$  is assumed to be normally distributed with zero mean and  $\sigma^g$  standard deviation. Labor productivity has an analogous structure.

Figure 2 shows the path of consumption, primary surplus and government debt over GDP in two economies which are identical except for the fact that in the second one  $\alpha$  starts at a value different from 0 (0.01). In both cases  $g_t$  and  $\vartheta_t$  are constant and equal to their unconditional mean. Both economies start with the same positive level of debt (set

<sup>11</sup> As standard in the optimal fiscal policy literature, it is not easy to establish that the feasible set of the Ramsey problem is convex. To overcome this problem in our numerical calculations we check that the solution to the first-order necessary conditions of the Lagrangian is unique.



**Figure 2**

equal to 100 per cent of GDP).<sup>12</sup> Given this parametrization, the initial default probability is equal to 5 per cent.

In the baseline case, government debt stays roughly constant at its initial value. This result is consistent with the main policy message coming out from the optimal fiscal policy literature. The intuition is that, as lump-sum taxes are not available, the only way to reduce debt is by increasing the distortionary tax rate today, which in turn would allow to reduce tax rates tomorrow. Under this path of taxes, households would initially enjoy less consumption and more leisure, whereas the contrary would be true later on (when the tax rate would be allowed to be lower, thanks to the reduction attained in the burden of debt). However, under standard assumptions on the utility function,

households prefer to smooth consumption and leisure over time and states. Therefore a benevolent government keeps distortionary taxes as smooth as possible, and allows debt to fluctuate around the initial value. In other words, a policy of debt reduction is sub-optimal. This policy implication does not hold anymore in a context in which households fear government default. Instead, taxes are increased at the beginning and debt is correspondingly reduced. To get an intuition of this result, it is important to understand the trade-off now faced by the government. On one side, as in the baseline framework, taxes are distortionary and therefore the government would like to keep them as constant as possible. On the other side, the government is aware that the perceived probability of default is higher the higher the debt level. These expectations translate into

<sup>12</sup> Of course, changing the initial value does not affect the qualitative features of the result, as long as  $b_{-1}$  is above the threshold  $\bar{b}$ .

higher interest rates on government bonds and higher interest payments. Since agents are learning, the only way to manipulate distorted beliefs is by reducing debt. Fiscal consolidation becomes optimal because it is a way to correct distorted expectations.

Moving from a single realization to a fully-fledged simulation, Table 1 shows the average values for consumption and leisure and for fiscal variables (tax rate, government debt and primary

surplus) in our two economies (averages are computed over 1000 simulated realizations of the shocks, for 20 time periods each). The qualitative results are confirmed. While in the rational expectation benchmark the mean value of bond holdings is equal to the initial one, in the economy with fear of default it is equal to 0.14, which means that fiscal consolidation is indeed optimal.

Correspondingly, in the second economy taxes and primary surpluses are on average higher (0.51 instead of 0.49 for taxes, 0.01 instead of 0.004 for the primary surplus). After 20 periods debt over GDP is equal to about 100 per cent in the case of a fully credible government, while it is equal to 35 per cent in the other scenario.

**Table 1**

**Average Allocation**

	<b>Full Credibility Model</b>	<b>Partial Credibility Model</b>
Consumption	.31	.3
Leisure	.38	.39
Labor Tax Rate	.49	.51
Bond Holding	.2	.14
Primary Surplus	.0004	.01

#### 4 A step backward: are stimulus packages justified?

In Section 3 we studied a post-crisis situation, in which the debt has already reached the threshold above which scepticism about government commitment to debt repayment kicks in. In such a context, we showed that doubts about the capability/willingness of the government to pay back debt require a substantial, and possibly quite painful, fiscal consolidation. It is therefore natural to ask whether implementing a fiscal expansion in the event of a crisis can be justified, given that the stimulus might trigger fears of a government default.

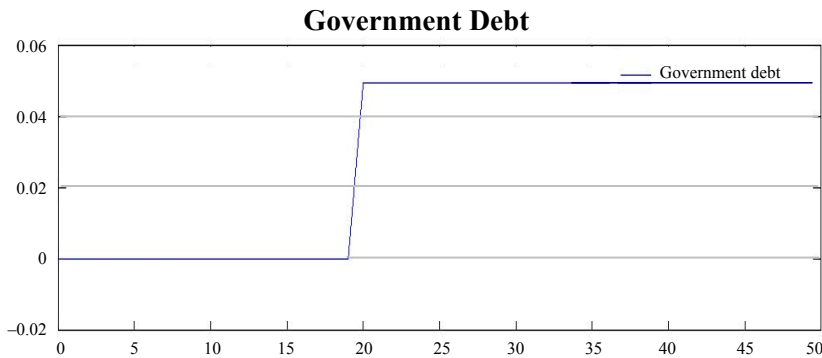
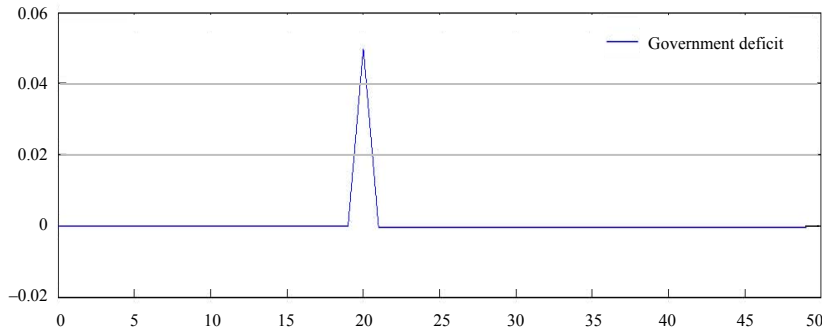
To answer this question, in this section we do not focus on the post-crisis period only, but we aim at characterizing the optimal fiscal policy both before and after the crisis.

In particular, we assume that productivity  $\vartheta_t$  is uncertain only at time  $t = T$ , when it can take two values, either  $\vartheta_L$  or  $\vartheta_H$ , with  $\Pr ob(\vartheta = \vartheta_H) = \pi$  and  $\Pr ob(\vartheta = \vartheta_L) = 1 - \pi$ , but it is constant in all other periods:  $\vartheta_0 = \vartheta_1 = \dots = \vartheta_{T-1} = \vartheta_{T+j} = \vartheta_L(1 - \pi) + \vartheta_H\pi \quad \forall j \geq 1$ .

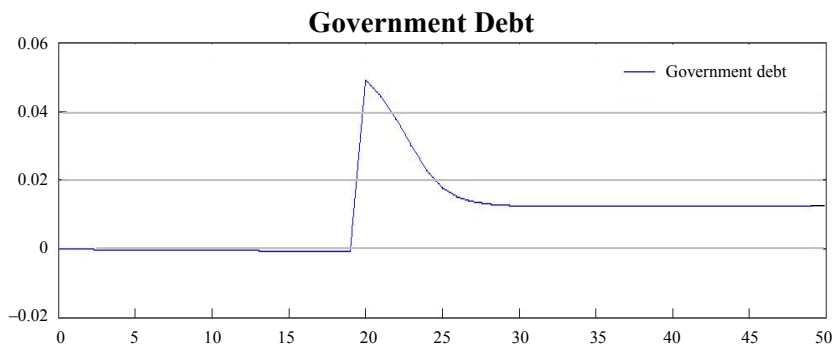
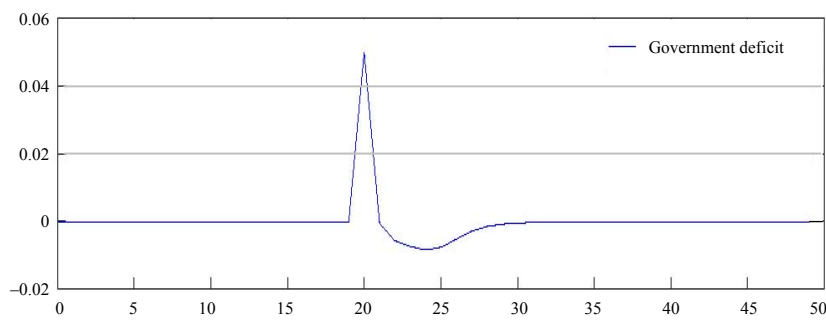
Figure 3 shows the optimal way to react to a large decrease in the productivity under the rational expectation benchmark. Before period  $T$  the government sets a constant tax rate in all periods and runs a balanced budget in all periods. At  $T$ , conditional on the bad shock realization, the government runs a primary deficit and issues debt, which from that period onwards is rolled

**Figure 3**

**Optimal Response to a Bad Shock Under Rational Expectations**  
(percent of GDP)  
**Government Deficit**

**Figure 4**

**Optimal Response to a Bad Shock Under Fear of Default**  
(percent of GDP)  
**Government Deficit**



over for ever. After the bad shock the tax rate is higher than before to pay for the higher debt services than before the crisis. But it is not optimal to bring debt to a lower levels.

Things are different when agents fear government default. In particular consider an economy in which debt has been below the “psychological” threshold above which concerns for debt repayment start to appear. The government faces a trade-off concerning the way to cope with the crisis. If the government decides to react to the bad shock by issuing bonds, effects on consumption will be smoothed, but agents will start to fear default, which has costs because it suboptimally increases interest rates and interest payments.

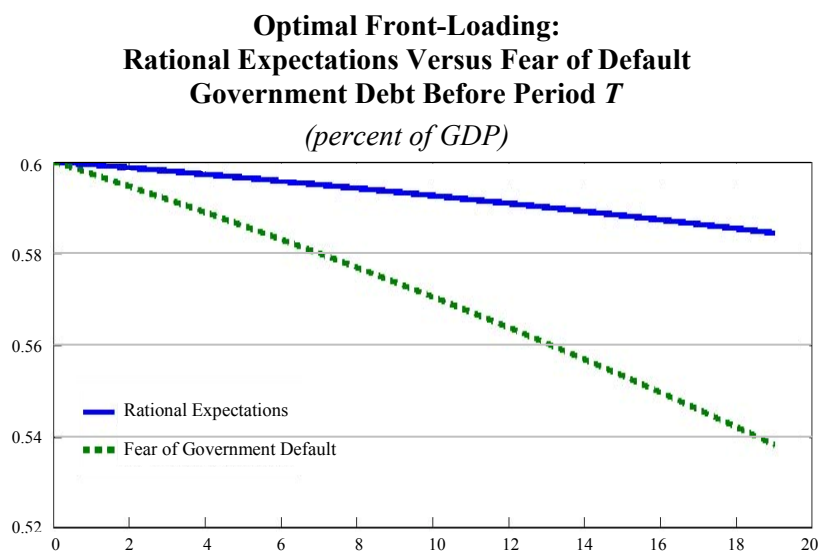
What is the optimal way to respond to the shock in this case? Figure 4 offers a graphical answer to the question, for the case of  $\pi = 0.5$ ,  $\vartheta_H = 1.1$  and  $\vartheta_L = 0.9$ . As in the rational expectations benchmark, the optimal fiscal policy implies running a budget deficit in the event of a realization of a bad shock in  $T$ . So one could conclude that in adverse circumstances a fiscal stimulus is justified even if it

induces fears concerning government debt.

However, this conclusion comes with several caveats. First, as we saw in the previous section, after the shock the government starts a fiscal consolidation aimed at reducing debt and increasing its credibility. Second, the jump in debt in  $T$  is lower with respect to the benchmark case. Third, the fact that agents may start fearing default at  $T$  influences the optimal fiscal policy even before period  $T$ .

Figure 5 shows the dynamics of government debt before the realization of the shock both in the case of a fully credible government and in the case of a non fully credible government. It is apparent that, while starting from the same initial debt levels, the latter reduces debt much more than the former.<sup>13</sup> This provides a theoretical rationale to the policy prescription of building “fiscal space” in good times in order to be able to use fiscal policy as a counter-cyclical tool in bad times.

Figure 5



## 5 Policy Implications for exit strategies: A tale of two countries

In the light of the model described above, how policy suggestions differ across different countries? First, the more investors are sceptical about the government willingness and/or ability to honor its debt, the more the fiscal authorities should pursue fiscal consolidation. Second, countries which are more indebted should act with more strength to reduce the debt burden. In both cases the consequences of distorted expectations are stronger, so more restrictive fiscal policies are required to restore trust in sovereign solvency.

We illustrate these insights using the German and the Italian cases. Both countries have been hardly hit by the economic crisis (in both GDP fell by about 5 per cent in 2009), but they have very different public finances (the debt-to-GDP ratio is at about 115 per cent in Italy and about 80 per cent in Germany). Moreover, perceived default risk as reflected in ratings, bond spreads and differences in the cost of credit default swap contracts, is significantly higher in the Italian case.

We calibrate the initial value for  $\alpha$  to match the sovereign default expectations implicit in the prices of CDS contracts. We set the initial debt at the 2009 (post-crisis) level in the two countries. Figures 6 and 7 respectively show how primary deficit and debt/GDP should evolve in the two countries. The solid line refers to Germany, whereas the dashed line refers to Italy. The country facing a higher debt level and higher default premia runs higher primary surplus and reduces debt quicker than the other one.

<sup>13</sup> The numerical example shown in Figure 5 has  $\pi = 0$ . In this scenario, debt is reduced between 0 and  $T-1$  by about 3 per cent by a fully credible government and by about 11 per cent by a non fully credible government (in both economies the initial debt level has been set equal to 75 per cent of GDP).

## Figure 6 6 Conclusions and future research

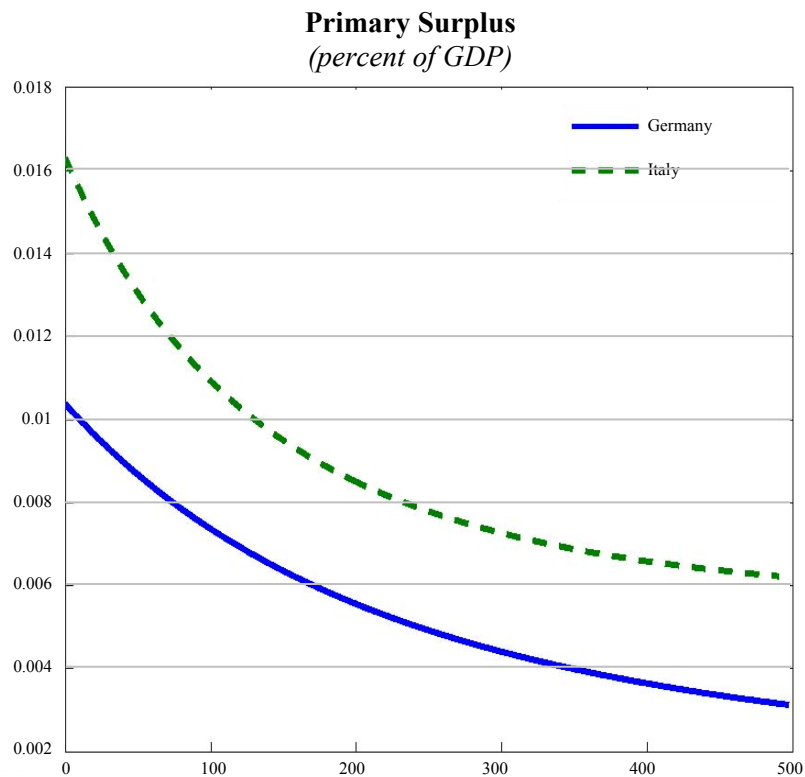
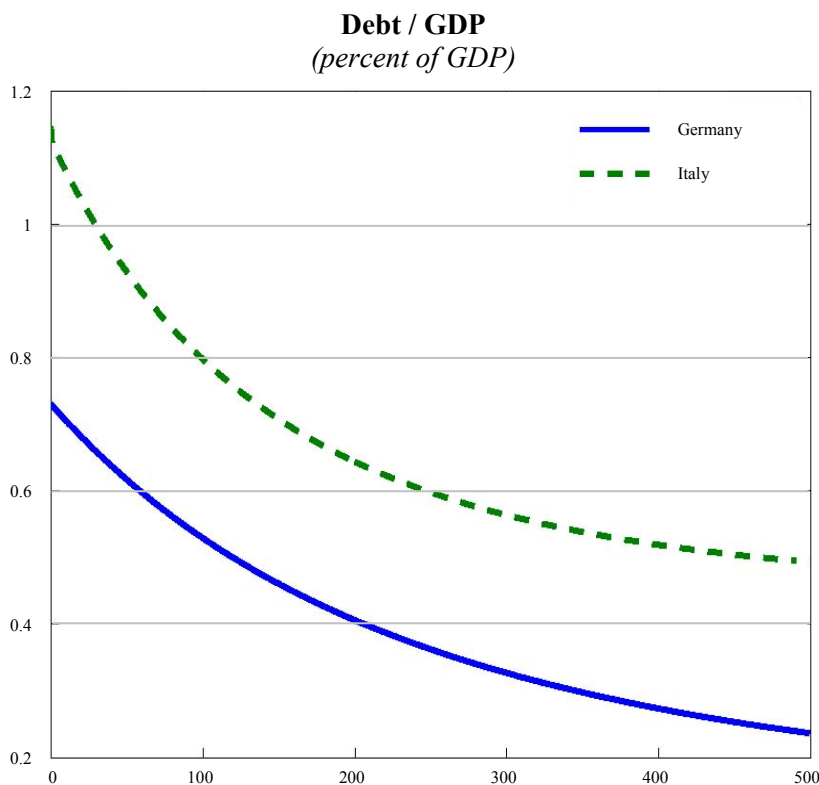


Figure 7



To moderate the adverse consequences of the recent downturn, governments have intervened through expansionary fiscal policy. These interventions were justifiable but have led to a steep increase in public debts. As economies gradually recover from the recession, there is disagreement about whether to stabilize debt ratios at post-crisis levels, or to bring them down to pre-crisis levels.

This paper offers a first formal theoretical rationale, within the framework of standard optimal fiscal policy theory, for implementing a debt reduction policy after an economic crisis. Moreover, we derive the optimal size of consolidation as a function of the degree of government credibility and of the post-crisis level of debt.

If agents fully trusted the commitment of governments to always honor their debt obligations, no further fiscal consolidation would be required. But if agents fear government default and a frontloaded debt reduction reduces such fears (thereby reducing risk premia on sovereign bonds and interest rates) a quick fiscal consolidation path, such as the one advocated by several

international organizations and observers, would be optimal.

The model can be extended in several possible dimensions. First, the assumption that default is not an equilibrium outcome should be relaxed. As our analysis refers to advanced countries, this assumption may be reasonable. Much less so for developing countries. Therefore one important extension would be to include a positive possibility of default in equilibrium. In this kind of model we conjecture that two possible equilibria can arise. When agents assign a low probability to the event of default, the low increase in the interest rate (with respect to the full credibility case) may be not enough to justify actual default. But when agents assign a very high probability of default, then the increase in the interest rate may support their beliefs because it may be optimal for the government to default. Because of the very high interest rate the cost of a transitory exclusion from the financial markets is lower than the distortionary cost of taxation to repay debt.

Another interesting extension would be to analyze fiscal and monetary coordination. In particular, it would be interesting to understand whether optimality requires that fiscal consolidation precedes or follows monetary tightening in the aftermath of a crisis, and whether a certain amount of inflation tax is an optimal way to pay the fiscal costs of the crisis.

Finally, in the paper we assumed that the government expenditure follows an exogenous stochastic process, as it is customary in the public finance literature. Because of this assumption, however, we cannot address the issue of the optimal composition of the post-crisis fiscal adjustment. In particular, should the fiscal authority reduce debt by higher taxes or by lower expenditure? Under standard assumptions on the utility and the production functions the optimal thing to do would probably be a mix of the two.

We leave all these extensions for future research.

## APPENDIX

**Proof of Proposition 1**

First we show that constraints equation 3, equation 4 and equation 15 imply equation 20.

Consider the period-by-period budget constraint after substituting for the household optimality conditions:

$$b_{t-1} = \frac{u_{c,t} s_t}{u_{c,t}} + \beta E_t \frac{u_{c,t+1}}{u_{c,t}} \hat{\pi}_t b_t \quad (33)$$

where  $s_t \equiv c_t - \frac{u_{l,t}}{u_{c,t}}(1-l_t)$ ,  $b_t$  is the amount of bond holdings and  $\hat{\pi}_t$  is the perceived probability at time  $t$  about government default in  $t+1$ . Multiplying both sides of equation 33 by  $u_{c,t} A_t$ , where  $A_t \equiv \prod_{k=0}^t \hat{\pi}_{k-1}$  we get:

$$b_{t-1} u_{c,t} A_t = (u_{c,t} c_t - u_{l,t}(1-l_t)) A_t + \beta E_t u_{c,t+1} A_t \hat{\pi}_t b_t \quad (34)$$

Notice that  $A_t$  has a recursive formulation given by:

$$A_t = A_{t-1} \hat{\pi}_{t-1} \quad (35)$$

Forwarding equation 35 one period we get:

$$A_{t+1} = A_t \hat{\pi}_t \quad (36)$$

Inserting equation 36 into equation 34 we get:

$$b_{t-1} u_{c,t} A_t = (u_{c,t} c_t - u_{l,t}(1-l_t)) A_t + \beta E_t u_{c,t+1} A_{t+1} b_t \quad (37)$$

Keeping iterating forward equation equation 37 and imposing the transversality condition  $\lim_{t \rightarrow \infty} \beta^t A_t b_t u_{c,t} \rightarrow 0$ , we get:

$$b_{t-1} u_{c,t} A_t = \sum_{j=0}^{\infty} \beta^j (u_{c,t+j} c_{t+j} - u_{l,t+j}(1-l_{t+j})) A_{t+j} \quad (38)$$

To prove the reverse implication, take any feasible allocation  $\{c_{t+j}, l_{t+j}\}_{j=0}^{\infty}$  that satisfies equation 20.

Define:

$$b_{t-1} = E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} u_{c,t+j} s_{t+j} \frac{1}{u_{c,t} A_t} \quad (39)$$

It follows that:

$$b_t = E_{t+1} \sum_{j=0}^{\infty} \beta^j A_{t+1+j} u_{c,t+1+j} s_{t+1+j} \frac{1}{u_{c,t+1} A_{t+1}} \quad (40)$$

$$\begin{aligned}
b_{t-1} &= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + E_t \sum_{j=1}^{\infty} \beta^j A_{t+j} u_{c,t+j} s_{t+j} \frac{1}{u_{c,t} A_t} = \\
&= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + \beta E_t \sum_{j=0}^{\infty} \beta^j A_{t+1+j} u_{c,t+1+j} s_{t+1+j} \frac{1}{u_{c,t} A_t} = \\
&= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + \frac{\beta}{u_{c,t} A_t} E_t u_{c,t+1} A_{t+1} E_{t+1} \sum_{j=0}^{\infty} \beta^j A_{t+1+j} u_{c,t+1+j} s_{t+1+j} \frac{1}{u_{c,t+1} A_{t+1}} = \\
&= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + \frac{\beta}{u_{c,t} A_t} E_t u_{c,t+1} A_{t+1} b_t
\end{aligned} \tag{41}$$

Using equation 36 we get:

$$b_{t-1} = s_t + \frac{\beta}{u_{c,t}} E_t u_{c,t+1} \hat{\pi}_t b_t \tag{42}$$

Using the households' optimality conditions given by (4) and (15), equation (42) coincides with equation (3).



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## A NOTE ON OPTIMAL FISCAL RULE FOR TURKEY

Mehmet Yorukoglu<sup>\*</sup>

*An optimal dynamic fiscal loss model for Turkey is presented in this note. The model is used as a benchmark to gauge the success of potential simple fiscal rules. Optimal linear and non-linear rules are shown to perform well.*

### 1 Introduction

For many reasons, governments seek to have stable expenditure paths through time. That individuals have a preference for smooth consumption paths is a relatively well-understood and well-studied phenomenon. However, empirical evidence across countries show that governments' preference for smooth consumption may be even stronger than that of individuals. For most of the countries where governments can easily borrow to smooth their expenditures against shocks, standard deviation of government expenditures is significantly smaller than the standard deviation of consumption of private agents. Shocks to output, government expenditures, and financial sector are inevitable. Together with these shocks, governments' strong taste for smooth consumption make unexpected hikes in debt to output ratio quite common. However, governments can borrow to smooth consumption during bad times in a sustainable manner, only if they can achieve to reduce their debt levels during good times. Here lies an important time-inconsistency problem, and failing to solve this problem in a credible way may paralyze governments' ability to borrow in bad times, making them pay very high risk premia as a consequence. Amending fiscal rules into law in a credible manner can help solve this problem and may be used as the necessary commitment device. To serve as a successful commitment device a fiscal rule must be credible, simple, and transparent.

In an environment where there are no shocks coming to economy, the government's problem would be simple. The government would choose an ideal debt to output level and would balance its budget at this level. Through time, the debt to output ratio, and the government expenditure would both be smooth – except that the latter grows at the growth rate of output. In reality, however, there are significant shocks coming to the economic environment. Under the environment with shocks, it makes sense that the government determines an *ideal debt to output ratio*  $b^*$ , and a *desired smooth government expenditure path*,  $g_t^*$ , so that no matter what shocks come, it will stay close to this ratio and the path through time. There is a trade off between deviating from the ideal debt to output ratio, and deviating from the desired smooth government expenditure path. If the government chooses to stay very close to one of these, it will have to sacrifice from being close to the other. Therefore the government will have to balance out these two deviations according to its preferences, *i.e.*, how much these deviations matter for the government.

The problem of the government can be modeled as a *dynamic fiscal loss minimization problem* where given an initial debt, output level, and the government's expectations about future income path, it picks an optimal path of expenditures and debt for current and future periods. The government does that to minimize a measure of total sum of deviations from the ideal debt to output ratio,  $b^*$ , and the desired smooth government expenditure path,  $g_t^*$ , through time.

In this note, we model and solve a *dynamic fiscal loss minimization problem* for Turkey. We use the optimal solution to this problem as a benchmark to measure the success of potential simple

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The views presented in this note are merely the author's personal views, they do not bind CBRT. The usual disclaimer applies.

fiscal rules. We calibrate the parameters and estimate the shock processes using Turkish data. Here we have two alternatives for modelling the income process. In the first alternative, a stochastic income process for Turkey can be estimated using historical data and a dynamic stochastic fiscal loss minimization problem can be solved. The second alternative is to use historical income data for future realizations of income in a dynamic fiscal loss minimization problem under the assumption of perfect foresight for government. Since estimating a reasonably accurate stochastic income process using historic data may be a problem, as a first step, we follow the second course in this note.

## 2 Economic environment

Consider a government which starts time zero with initial expenditure and debt levels,  $g_0$  and  $b_0$ , respectively. Let the output in the economy at time zero be  $y_0$ . Assume that the economy grows at rate  $\gamma$ . Given the initial expenditure level, government desires to set its future expenditure levels through time according to  $g_0^* = sy_0$  and  $g_t^* = \gamma^t g_0^*$ . Here  $s$  is the desired government expenditure to output ratio and given the initial desired government expenditure level  $g_0^*$  future expenditure levels smoothly grows at rate  $\gamma$ . This implies  $g_t^* = s\gamma^t y_0$ .

Given how the market's perceptions about the country's potential risk relates to its debt to output ratio, there is a desired level of debt to output ratio, denoted by  $b^*$ . The government seeks to keep its debt to output ratio  $\frac{b_t}{y_t}$  as close to  $b^*$  as possible. Assume that government taxes income at the constant rate  $\tau$ .

Consider a government seeking to minimize the dynamic loss function:

$$L = \min_{\{g_t, b_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left( \frac{1}{1+r} \right)^{t-1} \left[ \underbrace{\alpha_g \left( \frac{g_t}{y_0 \gamma^t} - s \right)^2}_{\text{expenditure smoothing}} + \underbrace{\alpha_b \left( \frac{b_t}{y_t} - b^* \right)^2}_{\text{debt smoothing}} \right] \right\} \quad (1)$$

subject to:

$$g_t + (1+r)b_{t-1} = b_t + \tau y_t \quad (2)$$

$$b_0 \text{ given.}$$

In (1), the loss function has two components; expenditure smoothing term and debt smoothing term. Here  $g_t$  and  $b_t$  denote the government expenditure and government debt at time  $t$ , respectively. The political preference parameters  $\alpha_g$  and  $\alpha_b$  can be seen as conveying the relative importance of expenditure smoothing and debt smoothing for the government. The government is assumed to discount future loss at rate  $\frac{1}{1+r}$ . The time  $t$  budget constraint of the government is given by (2). Given the initial debt and output level,  $b_0$  and  $y_0$  the government decides about the expenditure and debt sequences  $\{g_t, b_t\}_{t=1}^{\infty}$ , that will satisfy the budget constraint and that will minimize the total fiscal loss. Notice that one of the two political preference parameters,  $\alpha_g$  and  $\alpha_b$  are redundant. We can normalize one of these parameters.

Since the variables  $\gamma_t$ ,  $g_t$  and  $b_t$  all grow through time, transforming these variables into stationary ones will make the analysis more tractable. To this end, let  $\hat{y}_t = \frac{y_t}{\gamma^t}$ ,  $\hat{g}_t = \frac{g_t}{\gamma^t}$ , and  $\hat{b}_t = \frac{b_t}{\gamma^t}$ . The budget constraint can be transformed to:

$$\frac{g_t}{\gamma^t} + (1+r) \frac{b_{t-1}}{\gamma^t} = \frac{b_t}{\gamma^t} + \tau \frac{y_t}{\gamma^t}$$

which yields:

$$\hat{g}_t = \tau \hat{y}_t + \hat{b}_t - (1+r) \frac{\hat{b}_{t-1}}{\gamma}.$$

Notice that  $\frac{b_t}{y_t} = \frac{b_t}{\gamma^t} \frac{\gamma^t}{y_t} = \frac{\hat{b}_t}{\hat{y}_t}$ .

Let's restate the problem of the government. The government's problem in transformed variables reads:

$$L = \min_{\{\hat{g}_t, \hat{b}_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left( \frac{1}{1+r} \right)^{t-1} \left[ \alpha_g (\hat{g}_t - g^*)^2 + \alpha_b \left( \frac{\hat{b}_t}{\hat{y}_t} - b^* \right)^2 \right] \right\}$$

subject to:

$$\hat{g}_t = \tau \hat{y}_t + \hat{b}_t - (1+r) \frac{\hat{b}_{t-1}}{\gamma}$$

$$\hat{b}_0 \text{ given.}$$

The Lagrange Equation corresponding to this problem reads:

$$L = \min_{\{\hat{g}_t, \hat{b}_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left( \frac{1}{1+r} \right)^{t-1} \left( \left[ \alpha_g (\hat{g}_t - g^*)^2 + \alpha_b \left( \frac{\hat{b}_t}{\hat{y}_t} - b^* \right)^2 \right] \right. \right. \\ \left. \left. \lambda_t \left[ \hat{g}_t - \tau \hat{y}_t - \hat{b}_t + (1+r) \frac{\hat{b}_{t-1}}{\gamma} \right] \right) \right\}.$$

Efficiency conditions of this problem are:

$$\frac{dL}{d\hat{b}_t} = \alpha_g (\hat{g}_t - g^*) \frac{d\hat{g}_t}{d\hat{b}_t} + \alpha_b \left( \frac{\hat{b}_t}{\hat{y}_t} - b^* \right) \frac{1}{\hat{y}_t} + \frac{1}{1+r} \alpha_g (\hat{g}_{t+1} - g^*) \frac{d\hat{g}_{t+1}}{d\hat{b}_t} = 0,$$

and:

$$\hat{g}_t - \tau \hat{y}_t - \hat{b}_t + (1+r) \frac{\hat{b}_{t-1}}{\gamma} = 0.$$

Plugging this into the first condition yields:

$$\hat{b}_t = \frac{\frac{\alpha_g}{\gamma} \left( \tau \hat{y}_{t+1} + \hat{b}_{t+1} - g^* \right) - \alpha_g \left( \tau \hat{y}_t - \frac{1+r}{\gamma} \hat{b}_{t-1} - g^* \right) + \alpha_b \frac{b^*}{\hat{y}_t}}{\frac{\alpha_b}{\hat{y}_t^2} + \frac{\alpha_g(1+r)}{\gamma^2} + \alpha_g}.$$

The first order condition given in (3) gives us optimal debt to output level through time, but unfortunately it is a relatively complex dynamic relationship. We can compute the optimal solution but it does not directly provide us a simple fiscal rule that we can practically use. However, we can use the optimal solution to gauge the relative success of potential simple rules. That is the route that we follow in the rest of our analysis.

### 3 Results

We pick parameter values that represent Turkish economy as close as possible. The tax rate  $\tau$  is set to 0.3 so that government expenditures to output ratio is 0.3. Ideal debt to output ratio,  $b^*$  is picked as 0.3. We normalize  $\alpha_b$  to one and we will consider a range of values for  $\alpha_g$ . The average growth rate of real GDP in Turkey between 1970-2009 is used to calibrate  $\gamma$ , so that  $\gamma = 4\%$ . Initial output level  $y_0$  is normalized to one and initial debt level  $b_0$  is set to 0.45. Normalized real output growth numbers between 1970-2009 is used for future real output growth series.

The solution to the dynamic fiscal problem will be used as a benchmark to measure the success of potential simple linear rules. We will consider three potential fiscal rules:

i) sample fiscal rule considered:

$$d_t = d^* - 0.33(g_t - g^*) + 0.75(d_{-1} - d^*)$$

ii) optimized linear rule:

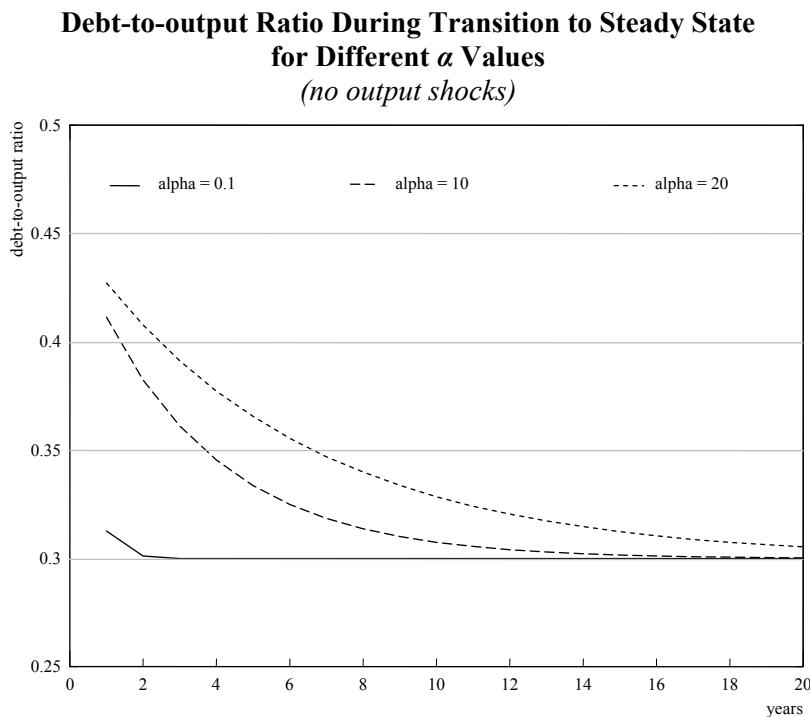
$$d_t = d^* - \alpha_g(g_t - g^*) + \alpha_d(d_{-1} - d^*)$$

iii) optimized non-linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*)^{\phi_g} + \alpha_d(d_{-1} - d^*)^{\phi_d}$$

In order to grasp the optimal fiscal policy better, consider an environment with no output shocks where the economy grows at a constant rate, 4 per cent. Assume that the initial debt to output ratio is 45 per cent and desired level of debt to output ratio is 30 per cent. Figure 1 and 2 exhibits the transition of optimal debt to output and optimal government expenditure to output ratios during transition to the steady state of this economy for different values of alpha. Three values of alpha are used,  $\alpha = 0.1, 10, 30$ . For a low level of  $\alpha$  – for  $\alpha = 0.1$ , for instance – debt smoothing is more important for the government compared to expenditure smoothing. As a result, at the expense of a more volatile expenditure path, the government chooses to have a debt to output ratio path close to the ideal level, 0.3. This is clearly seen in Figure 1.

For  $\alpha = 0.1$ , starting from a 45 per cent level, the transition to the steady state for debt to output ratio takes only one period. For larger  $\alpha$  the transition takes longer as expected. For  $\alpha = 30$ , transition is slow; even after 20 years transition is not totally completed. Figure 2 exhibits government expenditure to output ratio during transition to the steady state for again  $\alpha = 0.1, 10, 30$ . For  $\alpha = 0.1$ , the transition is fast. It starts from a government expenditure to output ratio of 16 per cent, far below the desired level of 30 per cent. For a typical government this means

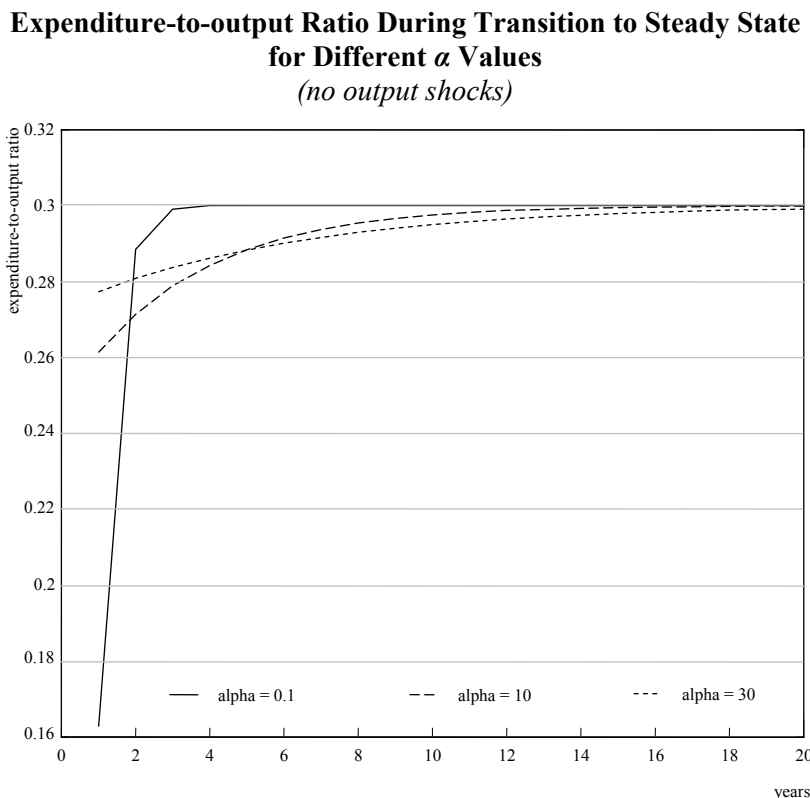
**Figure 1**

a deadly tight fiscal policy on transition. Most of the governments would probably not be able stand that tight of a fiscal policy profile, showing us that  $\alpha = 0.1$  does not represent a very realistic and credible preference parameter.

For higher level of  $\alpha$ , however, the transition is more comfortable. For  $\alpha = 30$ , a two per cent cut in the expenditure to output ratio, initially during transition, does the job.

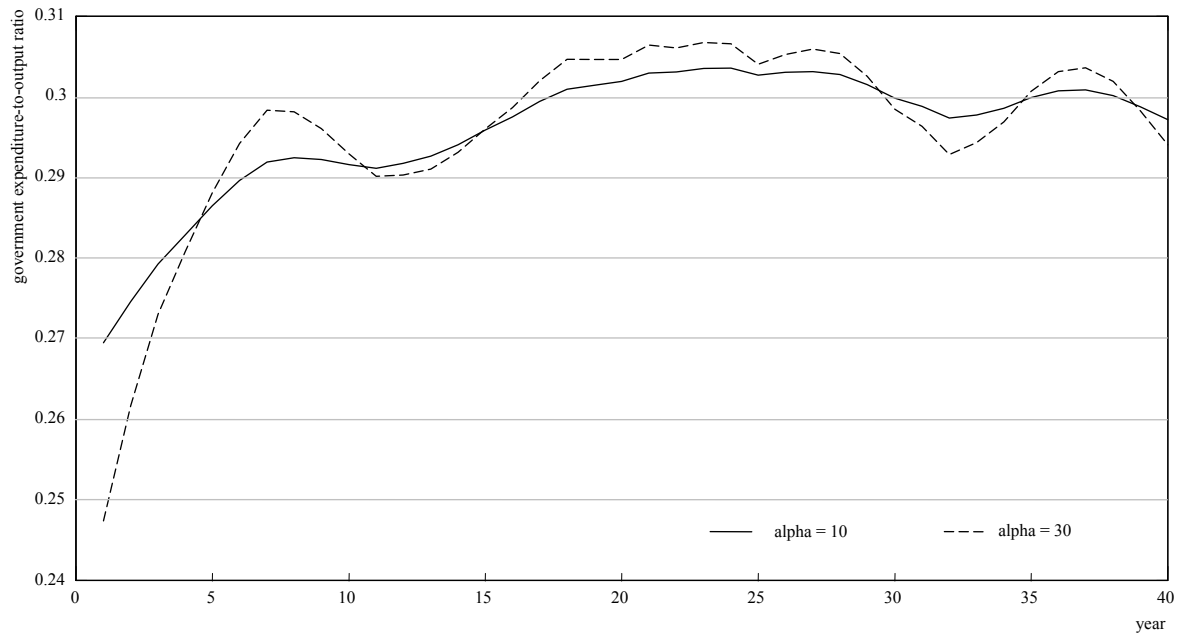
Using the historical output growth data for Turkey, Figure 3 plots the paths for optimal government expenditure-to-output ratio for  $\alpha = 10$  and 30. Output shocks create fluctuations around the desired level of 30 per cent. Notice that the fluctuations are smaller for higher  $\alpha$ . Similarly Figure 4 shows the optimal paths for debt to output ratio. As expected the transition is faster and fluctuations are smaller for lower  $\alpha$ .

Figure 5 plots the paths for the expenditure to output ratio derived from the optimal solution and from the sample fiscal rule considered using  $\alpha = 30$ . The sample fiscal rule creates significant fluctuations in the ratio, around the ideal level, 0.3. Similarly, the next figure exhibits the

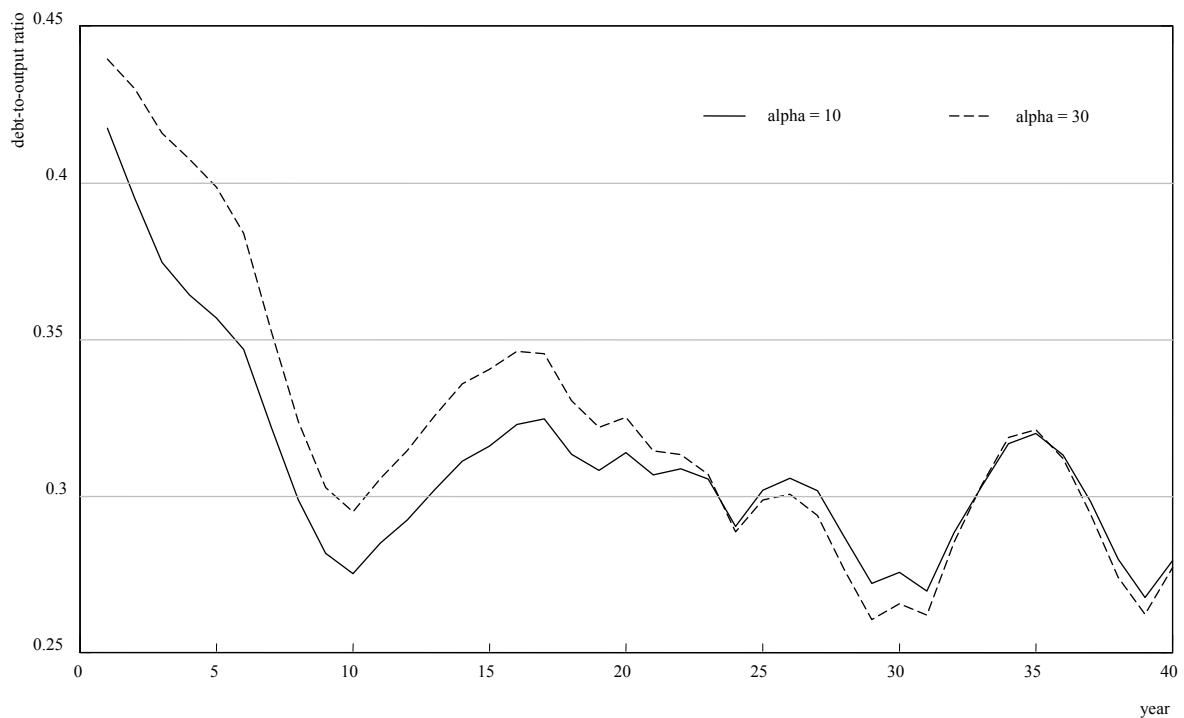
**Figure 2**

**Figure 3**

**Government Expenditure-to-output Ratio During Transition with Actual Growth Numbers**  
**Optimal Government Expenditure-to-output Ratio**

**Figure 4**

**Government Debt-to-output Ratio During Transition with Actual Growth Numbers**  
**Debt-to-output Ratio for Different Values of  $\alpha$**





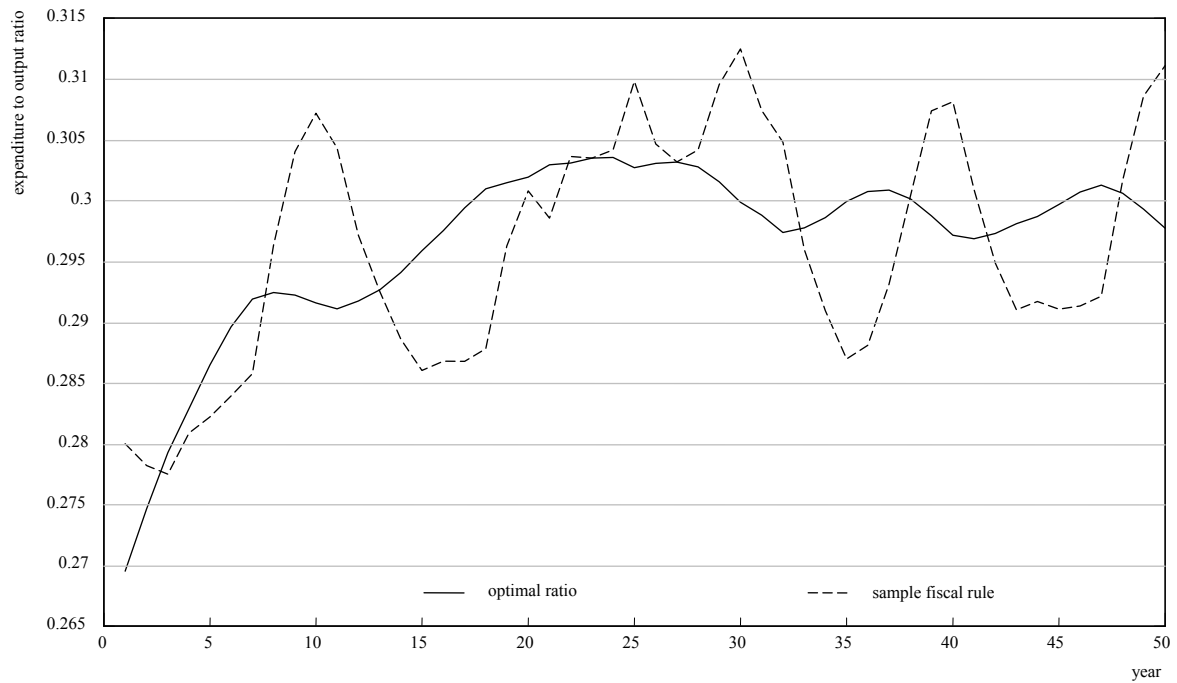
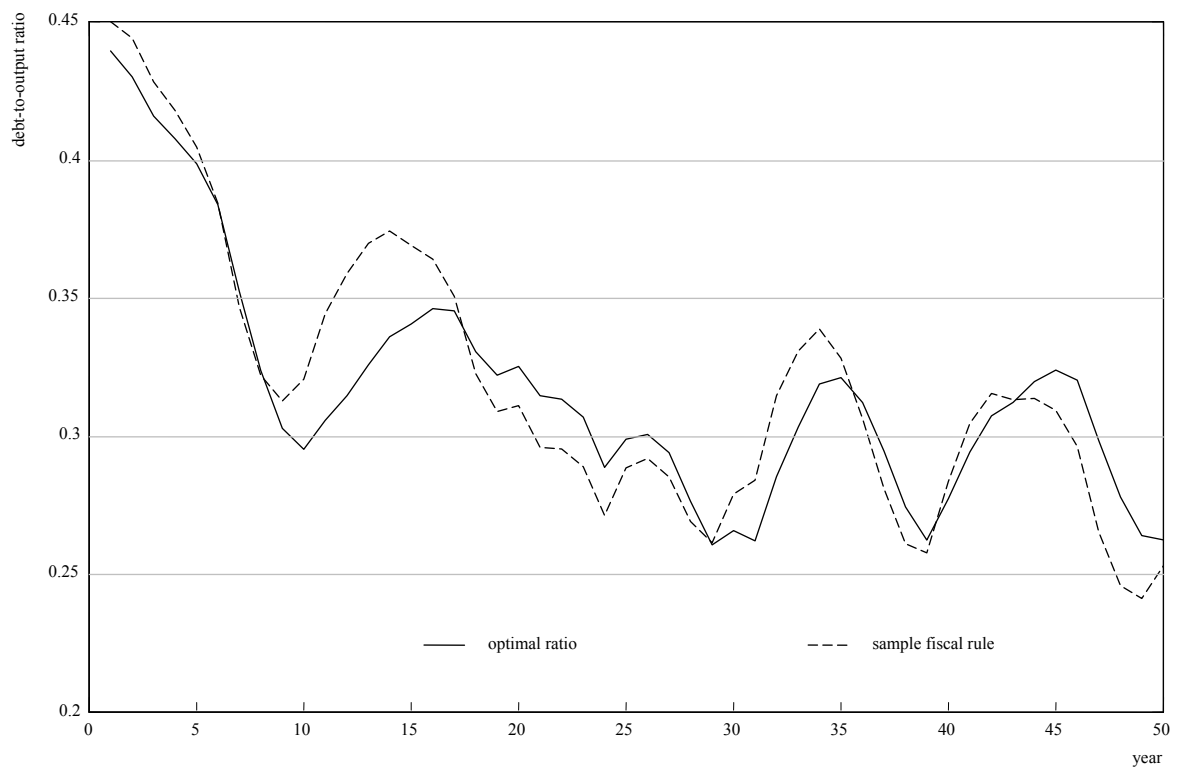
**Figure 5****Expenditure-to-output Ratio Optimal Versus Sample Fiscal Rule Compared****Figure 6****Optimal Debt-to-output Ratio Compared to the Sample Fiscal Rule**

Table 1

	$\alpha_g$	$\alpha_b$	$\phi_g$	$\phi_d$
Sample fiscal rule	-0.33	0.75	1	1
Optimal linear rule	-0.24	0.86	1	1
Optimal non-linear rule	-0.21	0.98	1.13	0.88

Table 2

	Loss Function	Std. of Govt. Exp.	Std. of Govt. Debt
Optimal solution	0.1915	0.31	2.42
Sample fiscal rule	0.2494	0.80	3.17
Optimal linear rule	0.2217	0.55	2.84
Optimal non-linear rule	0.2115	0.39	2.79

paths for the debt to output ratio derived from the optimal solution and from the fiscal rule. The transition takes longer for the fiscal rule yet, there is not much difference in terms of volatility of the fluctuations between the optimal solution and the sample fiscal rule. Figure 5 and 6 show that in terms of debt to output ratio the sample fiscal rule performs quite similar to the optimal solution, however in terms of expenditure to output ratio its performance is not that satisfactory. The large fluctuations in the expenditure to output ratio may create significant burden on the governments trying to follow the considered sample rule, which may undermine the credibility of the program.

### 3.1 Optimal linear and non-linear rules

Consider the linear and non-linear rules of the following forms.

The linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*) + \alpha_d(d_{-1} - d^*),$$

The non-linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*)^{\phi_g} + \alpha_d(d_{-1} - d^*)^{\phi_d}$$

For the linear and the non-linear rules, optimal parameter values that jointly minimize the loss function are computed for  $\alpha = 30$ . Table 1 gives the parameter values for the optimal linear and non-linear rules. Notice that for the optimal non-linear rule the elasticity parameter of the growth term implies a convex ( $>1$ ) where as the elasticity parameter of the debt term implies a concave ( $<1$ ) relationship.

Table 2 gives the value of the loss function, standard deviation of government expenditures and the standard deviation of government debt for the optimal solution, the sample fiscal rule, optimal linear rule, and the optimal non-linear rule, respectively. Notice that the optimal linear rule

improves the loss function significantly compared to the sample fiscal rule. Similarly, the volatility of the government expenditures is significantly reduced through optimal linear and non-linear rules. However, the volatility of government debt has not improved that significantly.

The paths of expenditure to output ratio are plotted for the optimal solution, the sample fiscal rule, the optimal linear and optimal non-linear rules respectively in Figure 7. The optimal non-linear rule notably reduces the magnitude of the fluctuations in the government expenditure to output ratio, making its application relatively comfortable for the government. Next, Figure 8 exhibits the paths of debt to output ratio for different rules. The paths do not differ from each other significantly.

The value of the loss function for different values of alpha in the range  $\alpha \in [0.1, 60]$  is shown in Figure 9. By definition, the loss function is at minimum for all values of alpha for the optimal solution. The loss function is at maximum for the sample fiscal rule. Notice that for high values of  $\alpha$  the loss function for the optimal non-linear rule approaches to the loss function of the optimal solution.

### 3.2 *How robust are the parameter values to the value of alpha?*

The optimal parameter values for the linear and non-linear rules are shown for different values of alpha in Figure 10. It is seen that optimal parameter values are quite robust to the political preference parameter  $\alpha$ . The value range for  $\alpha$  is  $[0.1, 60]$  with increments of 0.1. This is a rather encouraging result, since the optimal fiscal rule seems to be almost independent of government's preference of  $\alpha$ . Figure 11 plots the standard deviation of government expenditure derived from different rules for different  $\alpha$  values. It is seen that for all values of alpha in the range the volatility of government spending is significantly lower for the optimal linear and non-linear fiscal rules.

Similarly, Figure 12 exhibits the standard deviation of debt to output ratio from different fiscal rules for the wide range of  $\alpha$ . Notice that for reasonable values of  $\alpha$ , *i.e.*  $\alpha > 20$ , in fact the optimal non-linear rule outperforms even the optimal solution in the dimension of debt volatility.

### 3.3 *How robust are the results to the data starting point?*

Since we are using actual growth data, the results may depend on the data starting point. Starting points have no significance for our study, therefore we need to show that the results are robust to different data starting points. To that end, we computed the parameters of the optimal non-linear fiscal rule for different starting points. In Figure 13, using each year in the 40 year growth data as the starting point, computed parameters are shown. It is seen that the parameters are relatively robust to the data starting point.

### 3.4 *How robust are the results to other shocks?*

In addition to shocks to output, other shocks like shocks to government expenditures and interest rate shocks may also be important. Here we add exogenous government expenditure shocks and interest rate shocks to the analysis. We use identically and independently distributed shocks with some persistence. Shocks are assumed to persist for two periods. We introduce these shocks in the following way so that the problem of the government now reads:

Figure 7

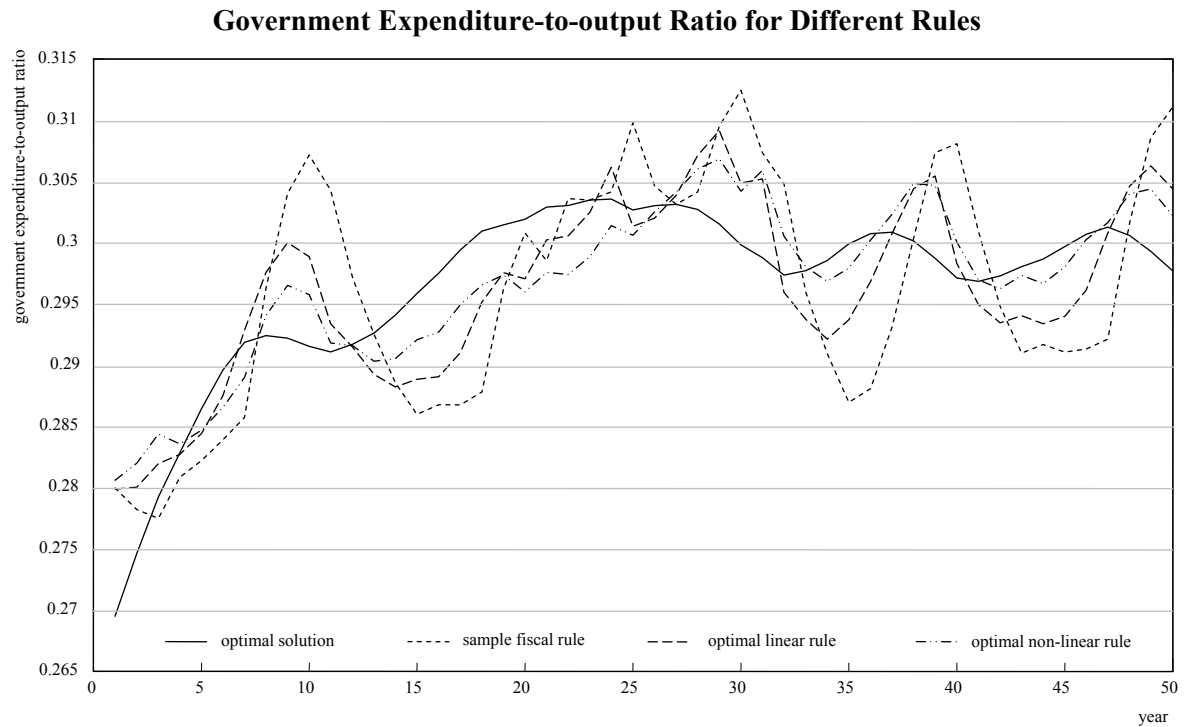


Figure 8

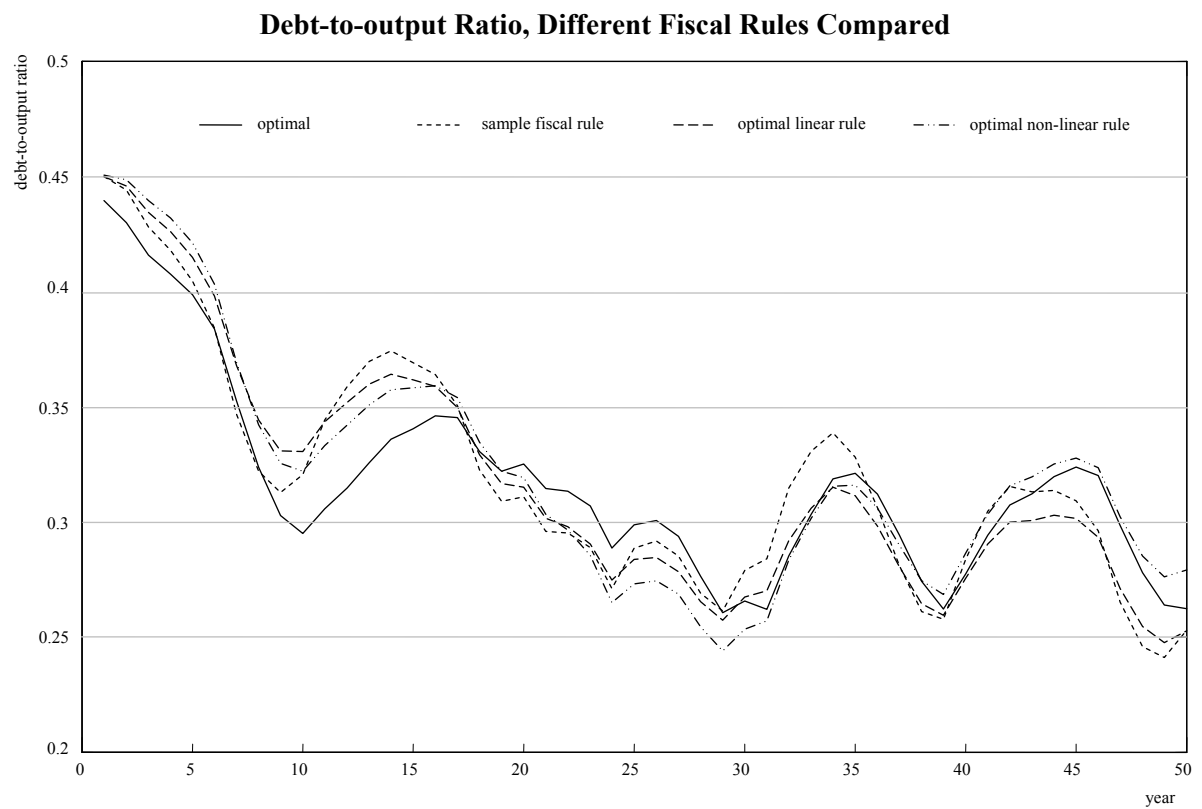


Figure 9

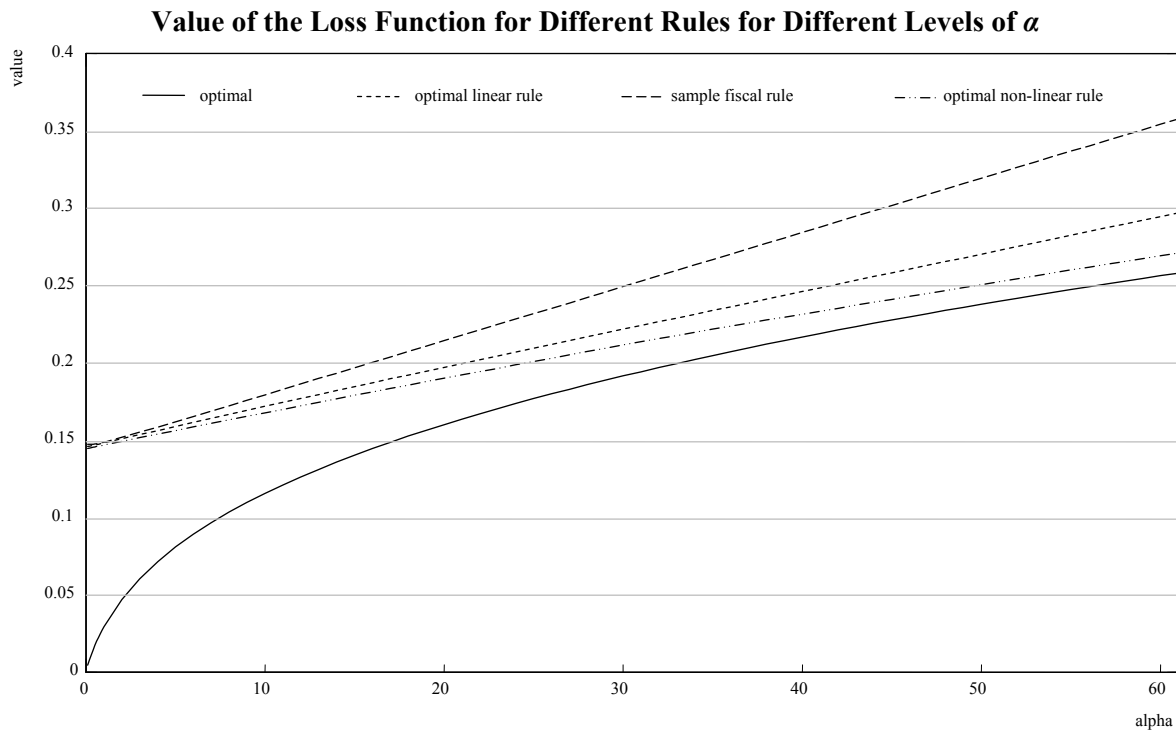


Figure 10

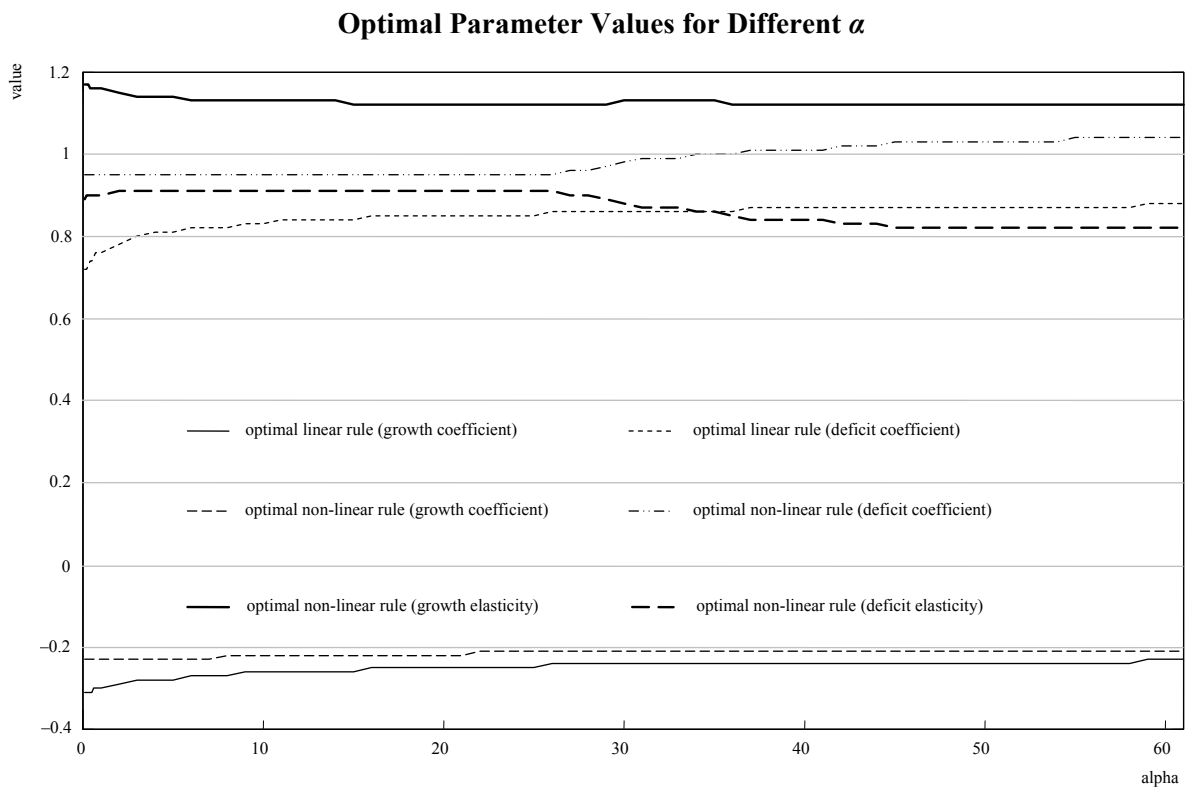


Figure 11

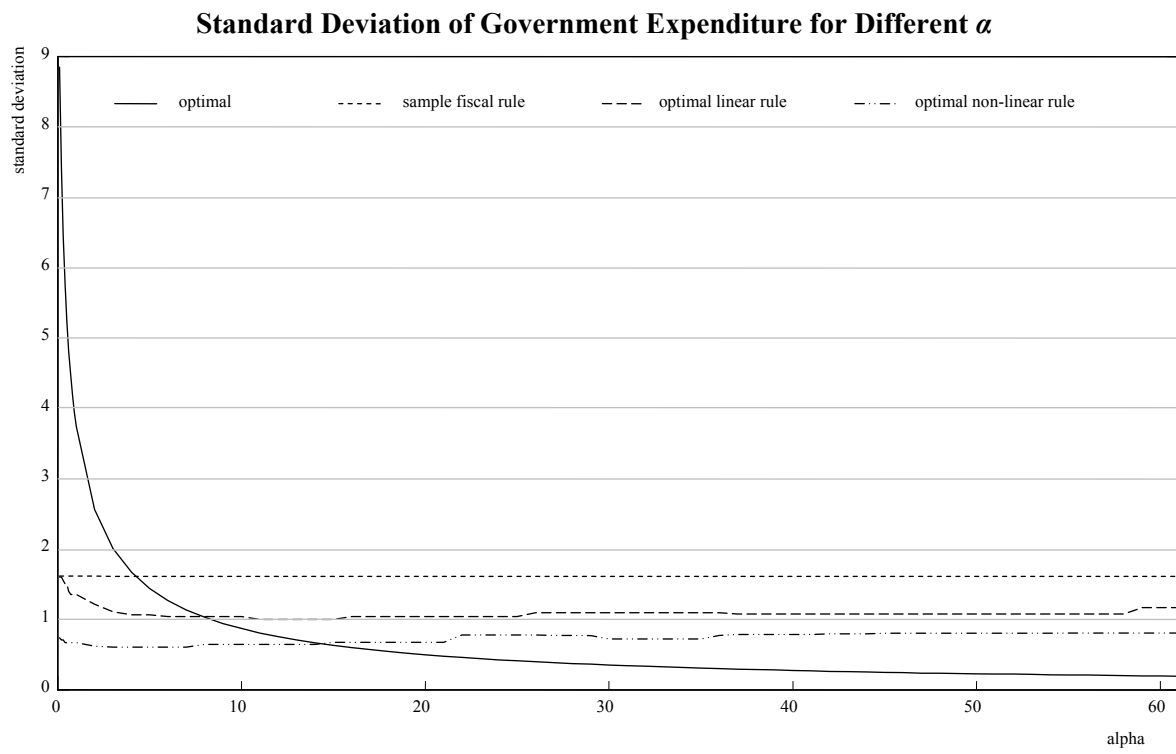


Figure 12

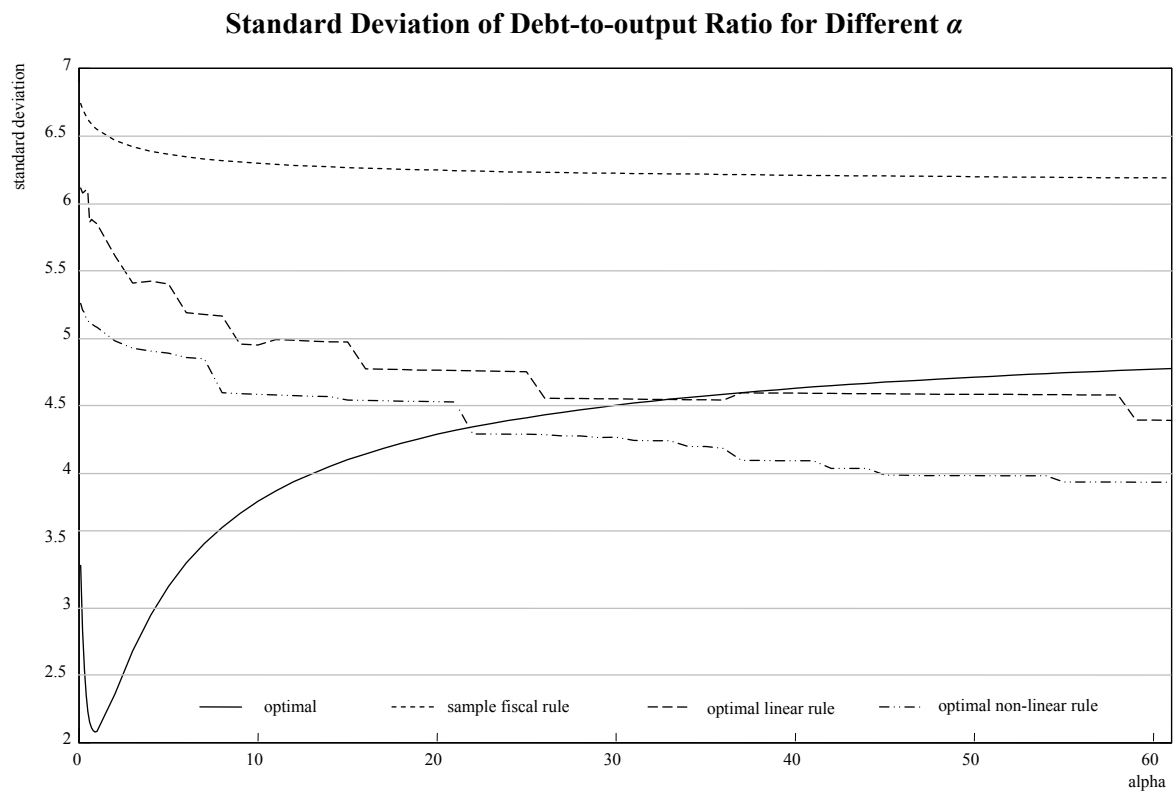
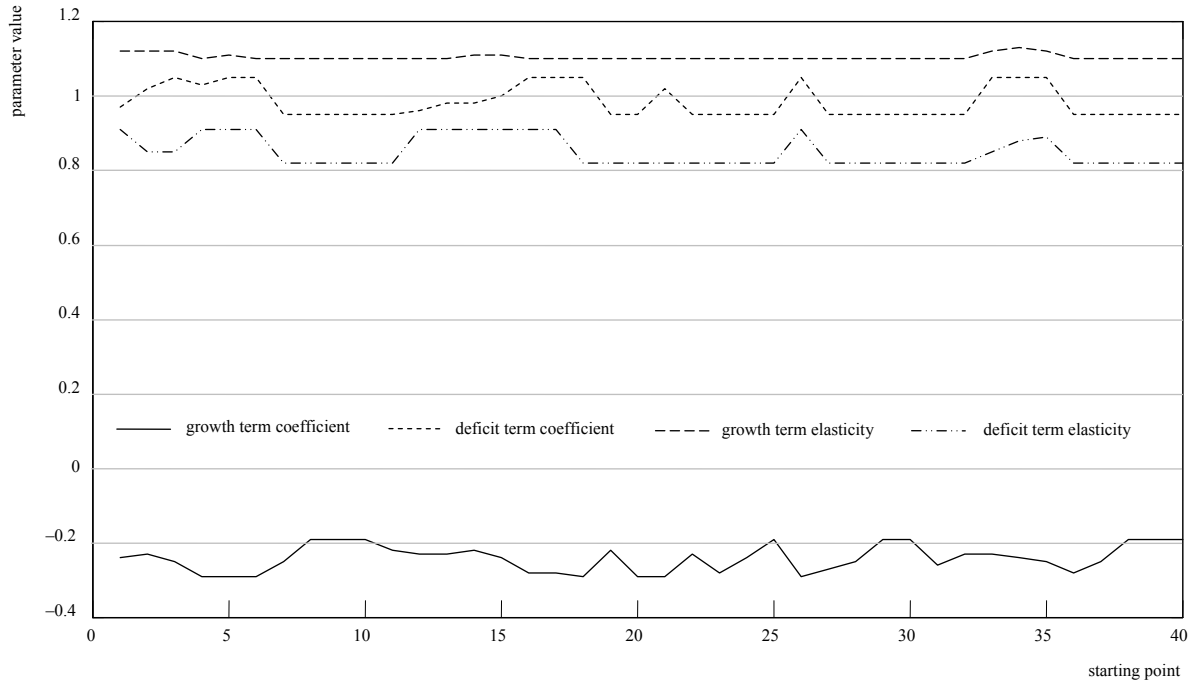


Figure 13

## Sensitivity of Parameter Values for the Optimal Non-linear Rule



$$L = \min_{\{\hat{g}_t, \hat{b}_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left( \frac{1}{1+r} \right)^{t-1} \left[ \alpha_g \left( \hat{g}_t - \underbrace{z_t g^*}_{\text{expenditure shock}} \right)^2 + \alpha_b \left( \frac{\hat{b}_t}{\hat{y}_t} - b^* \right)^2 \right] \right\},$$

subject to:

$$\hat{g}_t = \tau \hat{y}_t + \hat{b}_t - (1+r_t) \frac{\hat{b}_{t-1}}{\gamma},$$

$z_t$  is iid with mean 1,

$$r_t = \underbrace{x_t r}_{\text{interest rate shock}}, \quad x_t \text{ is iid with mean 1,}$$

$\hat{b}_0$  given.

Again, for the linear and the non-linear rule, optimal parameter values that jointly minimize the loss function are found for  $\alpha = 30$ . Table 3 gives the parameter values for the optimal linear and non-linear rules with government expenditure and interest rate shocks.

Notice that adding government expenditure and interest rate shocks does not change the values of optimal parameters for the linear and non-linear rules significantly (compare Table 1 with Table 3).

Table 3

	$\alpha_g$	$\alpha_b$	$\phi_g$	$\phi_b$
Sample fiscal rule	-0.33	0.75	1	1
Optimal linear rule	-0.26	0.86	1	1
Optimal non-linear rule	-0.23	1.00	1.14	0.89

#### 4 Conclusions

- The form of the sample fiscal rule considered (including terms with deviations from potential growth and deviations from ideal deficit level) is successful, but the parameters can be significantly optimized using Turkish growth data.
- Optimized linear rule significantly improves the loss function compared to the sample fiscal rule. Volatility (standard deviation) of government expenditures is drastically reduced by the optimized rule – by more than 30 per cent (from 0.8 to 0.55 per cent), making the rule much easier to apply politically for the government, hence increases the credibility of the applicability of the rule. Volatility of government debt is reduced by around 10 per cent through the optimized linear rule. Hence much of the improvement comes through the smoother government expenditure profile achieved.
- An optimized non-linear rule can further improve performance significantly. Although the optimized elasticity parameters (powers) of the non-linear rule are close to one (close to linear), using optimized non-linear rule reduces the loss function significantly. Compared to the sample fiscal rule considered, using the optimal non-linear rule reduces the volatility (standard deviation) of the government expenditures by more than 50 per cent (from 0.8 to 0.39 per cent). The volatility of government debt is reduced by around 15 per cent. Therefore optimal non-linear rule can improve the performance of the fiscal rule very significantly.
- The optimal parameter values for the linear and non-linear rules do not depend on the value of the political preference parameter,  $\alpha$ . This is a very encouraging result since it implies that our results are robust to government preferences. Hence we don't need to know the government's exact preference about  $\alpha$  to come up with the optimal fiscal rule.
- Adding government expenditure and interest rate shocks to the environment does not change the optimal parameter values for the linear and non-linear rules either. Hence the results are robust to potential alternative sources of shocks too.
- The last two robustness results increase the applicability and credibility of the optimal rules.



## THE NEW MEDIUM-TERM BUDGETARY OBJECTIVES AND THE PROBLEM OF FISCAL SUSTAINABILITY AFTER THE CRISIS

*Paolo Biraschi,\* Marco Cacciotti,\* Davide Iacovoni\* and Juan Pradelli\*\**

*The paper analyses the medium-term objectives (MTOs) recently adopted by the EU Member States as a reference for the multilateral budgetary surveillance, assessing the ability of the new MTOs to promote long-term fiscal sustainability. The paper calibrates the (yet undisclosed) algorithm for computing the minimum budgetary targets that EU countries can declare as MTO and discusses two novel features of the algorithm: a supplementary debt-reduction effort requested from high-debt countries, and the partial frontloading of the expected future increases in age-related expenditure – the cost of ageing. The paper evaluates the impact of the crisis on EU countries' current as well as future MTOs through the channels of higher public debt, lower growth potential, and higher cost of ageing. On the basis of alternative scenarios for macroeconomic and budgetary conditions as of 2012 – when the next revision of MTOs is scheduled –, the paper concludes that prospective MTOs would be more stringent than the current ones. Therefore, a path for gradual fiscal tightening is already embedded into the European fiscal framework and should be considered when discussing exit strategies. Finally, an alternative indicator linking MTOs to the current fiscal and financial imbalances is presented.*

### 1 Introduction

The reform of the Stability and Growth Pact (SGP) introduced a number of relevant amendments to both the preventive and corrective arm of the EU fiscal framework. In particular, a new definition of the medium-term objectives (MTOs), which inform the EU multilateral budgetary and macroeconomic surveillance, was incorporated in the Stability and Convergence Programmes (SCPs) and their assessment by the European Commission.

EU Member States indicate MTOs for budget balances in structural terms, *i.e.*, cyclically-adjusted and net of one-off and temporary measures. The revised SGP establishes that MTOs may be country-specific, depending on national macroeconomic and public finances conditions and having regard to risks to long-term sustainability of public finances. General criteria for determining the medium-term budgetary targets agreed by the European Council consider the government debt, the potential output growth, and a safety margin with respect to the Maastricht limit of 3 per cent of GDP for the nominal budget deficit.

Initially, the revised SGP did not provide a well-defined rule for implementing the MTO determination criteria and then large room for judgmental analysis was left to each Member State when setting budgetary targets. In 2009, Member States and the European Commission agreed on a methodology for computing MTOs that renders operational the MTO determination criteria. The methodology encompasses not only public debt, potential growth, and budgetary safety margins, but also the implicit government liabilities associated with rising expenditure due to ageing populations. Two novel features are incorporated: a supplementary debt-reduction effort – required from EU countries whose debt-to-GDP ratio exceeds the Maastricht 60 per cent reference value –

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aimed at promoting convergence of debt ratios towards prudent levels; and a partial frontloading of cost of ageing – requested from all EU countries indistinctly – that seeks to cover part of the future increases in age-related spending. In the 2009 updates of SCP, 15 EU countries have declared MTOs calculated using the new methodology; however, neither they nor the European Commission have ever disclosed the new, specific algorithm for computing MTOs.

In the current debate on fiscal consolidation and high public indebtedness, the current MTOs could potentially play a role as part of the exit strategies. Being a formal constraint on fiscal policies in terms of medium-term budgetary outcomes, MTOs could help in planning a gradual reversal of expansionary stimulus. They could also facilitate coping with the problems of high debt and ageing-related implicit liabilities by requesting additional public savings through the supplementary debt-reduction effort and the partial front-loading of cost of ageing. There is a risk, on the other hand, that economic recovery falters because fiscal tightening starts too early and adjusts too much. In this regard, the current MTOs that many EU countries have declared in the 2009 updates of SCP are excessively demanding and imply unrealistically large budgetary consolidation efforts going forward. Furthermore, the prospective MTOs will probably be even more stringent than the current ones.

The paper is organized as follows. Section 2 describes the institutional framework of the new MTO methodology. Section 3 explores the analytical underpinnings of MTOs, conducts a calibration exercise to uncover the (yet undisclosed) algorithm for computing MTOs, and provides a critical assessment on the implications on fiscal sustainability of the supplementary debt-reduction effort and the frontloading of cost of ageing. Section 4 assesses the impact of the financial and economic crisis on EU Member States' MTOs. Section 5 elaborates an alternative modality for determining MTOs that replaces the supplementary debt-reduction effort by a synthetic exposure index that measures funding pressures and risks facing all sectors in a given country at a certain point in time. The index includes variables related to the short-term sustainability of public debt, the risk of distress in the financial and banking system, and the build-up of sectoral and external imbalances. Section 6 concludes.

## **2 Institutional framework of the new MTO methodology**

The legal basis of the new MTO methodology is found in the Conclusions of the 2005 Spring Council of the European Union (2005a), which defined the main economic principles of the SGP reform and ensured the required political commitment to make the endorsement of the European fiscal framework fully credible (European Commission, 2005 and 2006). Given the previous failures by EU Member States to reach MTOs, the European Council strengthen the SGP preventive arm by allowing MTOs for structural budget balances to be country-specific and to take into account differences across countries in their economic fundamentals and risks to public finance sustainability.

MTO differentiation, in turn, had to consider the countries' government debt and implicit liabilities – especially those associated with rising age-related expenditure –, potential growth, and a safety margin minimizing chances of having budget deficits breaching the Maastricht 3 per cent reference value. In addition, the importance of fiscal soundness for monetary stability in a currency union warranted further differentiation by membership to the Euro Area and ERM II. Thus, Member States adopting the Euro, or in the process of doing it, were requested to declare MTOs in a range between a structural deficit of 1 per cent of GDP – for low debt/high potential growth countries – and a balanced or in surplus structural budgetary position for high debt/low potential growth countries.

The European Council made explicit a triple aim pursued by MTOs: (i) providing the aforementioned safety margin, (ii) ensuring rapid progress towards public finance sustainability; and (iii) allowing an appropriate budgetary margin of manoeuvre to support public investment. This triple aim suggested that MTOs would facilitate the use of fiscal policies for short-run stabilization purposes, while seeking the preservation of long-run fiscal soundness. General criteria for the quantitative determination of country-specific MTOs transpired from the triple aim as well as from the broad goals of the SGP reform. MTO determination criteria were, nevertheless, too general and even the European Council acknowledged that modalities for implementing and operationalizing them had to be carefully elaborated.

The consideration of public debt and implicit liabilities in the determination of country-specific MTOs raised a number of conceptual and methodological issues on the indicators of government liabilities to be used (stock vs flow measures) and the definition of implicit liabilities to be adopted (broad vs narrow definition, backward- vs forward-looking notions, inclusive or not of contingent liabilities such as financial bail-outs). While technical discussion were taking place, MTOs were determined on the sole basis of the government debt-to-GDP ratio, potential growth, and the budgetary safety margin, leaving implicit liabilities aside. Lacking clear indications on the hierarchical order to be attached to these three variables, the European Commission and the Member States agreed that the MTO determination criterion related to debt should be given more relevance.

Over the transition period, different modalities to combine the variables relevant for determining MTOs in a well-defined quantitative framework were discussed (European Commission, 2007). A final agreement was achieved in the Spring 2009 and officially came into force in November 2009 with the introduction of the corresponding provisions in the Code of Conduct (CoC). For the first time 15 EU Member States have declared MTOs computed using the new methodology in their 2009 updates of SCP. However, neither they nor the European Commission have ever disclosed the specific MTO algorithm.

### **3 Analytical underpinnings of the new MTO methodology**

The MTO is a quantitative target for the structural budget balance that an EU Member State commits itself to achieve over a certain time horizon, usually the planning horizon of the SCP. The MTO should therefore constrain the country's fiscal policies to eventually deliver an overall budget balance – adjusted by cyclical fluctuations, net of one-offs and temporary measures, and expressed as percentage of GDP – that meets the target or improves upon it. The quantitative determination of country-specific MTOs has always been a politically-sensitive issue and the triple aim pursued largely shapes the determination criteria.

First, the MTO intends to provide a safety margin against the possibility that, given an unexpected worsening of economic conditions, the nominal budget deficit suddenly rises and exceeds the Maastricht 3 per cent of GDP reference value. This notion underpins the country-specific MTO minimum benchmark, calculated using a country's sensitivity of budget balance to output gap together with an estimate of output volatility – e.g., the extreme (negative) value of the country's output gap that might occur in the future with a certain probability (European Commission, 2007; Codogno and Nucci, 2007). Thus, a country whose budget balance is more (less) sensitive to cyclical fluctuations – probably as a result of institutional arrangements concerning the operation of automatic stabilisers – should be committed to a more (less) demanding MTO and therefore to a tighter (looser) medium-term target for the structural budget balance. A similar commitment is expected from a country exhibiting a business cycle with large

(small) output movements since an unexpected, large drop in economic activity is more likely (unlikely) to occur, dragging down the budget balance.

Second, the MTO aims to ensure progress towards sustainability of public finances, defined broadly to include both the explicit liabilities corresponding to the current stock of debt and the implicit liabilities associated with the expected deterioration of fiscal balances due to rising age-related expenditure induced by demographic trends (*i.e.*, the cost of ageing). As far as sustainability of explicit liabilities is concerned, the MTO seeks convergence of high debt levels towards the Maastricht 60 per cent of GDP reference value. Thus, a country whose debt-to-GDP ratio is above (below) that threshold should pursue a more (less) demanding MTO, as well as a country having low (high) prospective growth rates of potential GDP. High-debt and low-growth countries would then seek to achieve a stronger fiscal position leading to debt growth below nominal GDP growth, eventually converging to the Maastricht reference value. With respect to sustainability of implicit liabilities, the MTO aims at the partial frontloading of the cost of ageing. Such a frontloading requires a country to improve budget balances and increase public savings in the present (hence reducing the pace of debt accumulation or even increasing assets), so that it makes additional financial resources available in the future (under the form of a lower debt burden or even a higher stock of assets) to cope better with the increase in age-related expenditure when it eventually kicks in. According to this notion, a more (less) demanding MTO is therefore expected from a country facing a high (low) cost of ageing or is willing to frontload a larger (smaller) proportion of that cost.

Third, the MTO allows for room of manoeuvre for a country that chooses to undertake public investment as a means to support aggregate demand or to promote economic growth. In particular, a low-debt country is granted a less demanding MTO so that its fiscal budget can accommodate additional investment spending without failing to fulfil the committed MTO.

For the purpose of our analysis, we presume that the MTO determination criteria are implemented by a formal rule or algorithm that sets a minimum value for the MTO a country can declare and is committed to achieve. In fact, the CoC explicitly gives freedom to all EU countries to commit themselves to more ambitious targets than those implied by the MTO determination criteria, “as if” there was a formal rule for implementing them. In the 2009 updates of SCP, 15 EU countries have declared the MTOs that result from implementing the MTO determination criteria as agreed in Spring 2009. But they have not disclosed the MTO methodology underlying their committed budgetary targets. In the next part of this section, we attempt to uncover that algorithm on the basis of the CoC statements, official publications by the European Commission, some pieces of information collected from the 2009 updates of SCP, a few assumptions concerning the algorithm specification, and the countries’ declared MTOs following the new methodology.

### 3.1 *A calibrated model for the MTO determination*

The algorithm implementing the MTO determination criteria loads as input the fiscal and macroeconomic variables relevant for the MTO triple aim, and delivers as output the minimum budgetary target that a country can go for. Given the minimum target resulting from the algorithm (hereinafter denoted MTOMT), a country must commit to achieve an MTO (denoted MTOD, with D standing for “declared”) that is equal or more demanding than that minimum. While MTOD is observed, MTOMT is not, but it must satisfy  $MTOMT \leq MTOD$ .

To uncover the MTOMT algorithm, we follow closely the CoC statements suggesting that MTOMT must be the most demanding value among three alternatives:<sup>1</sup> (i) the country-specific

<sup>1</sup> The more informative part of the CoC (2009, p. 4) concerning the MTO determination states: “Specifically, the country-specific (continues)”

MTO minimum benchmark (MTOMB), which constitutes the aforementioned safety margin and whose value has been already disclosed by the European Commission (2007, p.107); (ii) the country-specific commitment by participants of Euro Area and ERM II to achieve at least a structural deficit of 1 per cent of GDP (MTOEA); and (iii) the country-specific MTO that addresses the issues of sustainability of public finances and budgetary manoeuvre granted to low-debt countries (MTOSM, with *S* standing for “sustainability” and *M* for “manoeuvre”). Hence, for country *i* the algorithm states:

$$MTOMTi = \text{Max} (MTOMBi, MTOEAi, MTOSMi) \quad (1)$$

with *MTOEAi* being –1 if country *i* belongs to Euro Area or ERM II and 0 otherwise.

The CoC gives some guidance on how to calculate the *MTOSM* by saying that it should encompass three components: (i) the budget balance that stabilises the debt-to-GDP ratio at 60 per cent given a country’s long-term growth rate of potential GDP; (ii) a supplementary debt-reduction effort for countries whose debt exceeds 60 per cent of GDP; and (iii) a proportion of the adjustment needed to cover the present value of the future increase in age-related expenditure (*i.e.*, the cost of ageing). The precise algorithm for computing these three components of *MTOSM*, however, is not disclosed in the CoC but we now attempt to uncover it.

The debt-stabilising balance is a standard result in the analysis of debt dynamics and should be computed as  $-(60 \text{ } gi)/(1+gi)$ , where *gi* denotes country *i*’s long-term growth rate of potential GDP at current prices and is regularly estimated by the Ageing Working Group (AWG) for all EU countries (European Commission and Economic Policy Committee, 2008 and 2009).<sup>2</sup>

The adjustment needed to finance the country’s cost of ageing is simply the *S2E* indicator calculated by AWG’s assessment of long-term sustainability of public finances (European Commission, 2009b). By reading several 2009 updates of SCP, we find evidence that the CoC’s required proportion of this adjustment is either 33 per cent of the *S2E* indicator or the annualized value of cost of ageing cumulated until 2040.<sup>3</sup> In the former case, we must use  $0.33 \text{ } S2Ei$  for country.

The supplementary debt-reduction effort is a novel feature of the *MTOSM*, with neither the literature on debt sustainability nor the AWG sustainability framework offering an apparent counterpart. We therefore must make a specification assumption taking into account the stated purpose of the effort, namely to induce convergence of debt-to-GDP ratios in high-debt countries towards the Maastricht 60 per cent reference value. Accordingly, we specify the effort to be proportional to the excess of the debt-to-GDP ratio over and above the 60 per cent reference value. Hence, we postulate  $k (di - 60)$  where *di* is country *i*’s debt-to-GDP ratio and the parameter *k* is calibrated below.

The three components of *MTOSM* for country *i* are given by:

$$MTOSMi = -(60 \text{ } gi)/(1+gi) + k (di - 60) + 0.33 \text{ } S2Ei \quad (2)$$

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*MTOs should take into account three components: i) the debt-stabilising balance for a debt ratio equal to the (60 per cent of GDP) reference value (dependent on long-term potential growth), implying room for budgetary manoeuvre for Member States with relatively low debt; ii) a supplementary debt-reduction effort for Member States with a debt ratio in excess of the (60 per cent of GDP) reference value, implying rapid progress towards it; and iii) a fraction of the adjustment needed to cover the present value of the future increase in age-related government expenditure. This implies a partial frontloading of the budgetary cost of ageing irrespective of the current level of debt. In addition to these criteria, MTOs should provide a safety margin with respect to the 3 per cent of GDP deficit reference value and, for euro area and ERM II Member States, in any case not exceed a deficit of 1 per cent of GDP”.*

<sup>2</sup> The CoC (2009, p. 4) states: “Potential growth and the budgetary cost of ageing should be assessed in a long-term perspective on the basis of the projections produced by the Working Group on Ageing attached to the Economic Policy Committee”.

<sup>3</sup> Germany’s SCP states: “The medium-term objective of  $-\frac{1}{2}$  per cent of GDP results under both possible calculation methods, *i.e.*, whether 33 per cent of the costs as a result of ageing are prefinanced or all costs as a result of ageing are covered until 2040”. (p. 27). See also Bulgaria’s SCP, p. 30, Italy’s SCP, p. 17, and Luxembourg’s SCP, p. 10-11.

To calibrate  $k$ , we take advantage of the countries' MTOs declared in the 2009 updates of SCP and proceed guided by an educated guess. Nowadays, high-debt EU countries – which would be relatively more penalized by the supplementary debt-reduction effort – are likely to prefer having as much fiscal space as possible in order to cope with the crisis and promote the recovery. Consequently, it is likely that in the 2009 updates of SCP, they have declared their MTOD equal to their minimum budgetary targets MTOMT. By assuming such a case, for a high-debt country  $j$  we can set  $MTOMT_j = MTOD_j$ ; or alternatively use (1) and (2) to obtain equation (3) below. By applying equation (3) to a high-debt country  $j$ , we obtain one equation in the unknown parameters  $k$  that allows us to calibrate it:

$$MTOD_j = \text{Max} (MTOMB_j, MTOEA_j, -(60 g_j)/(1+g_j) + k (dj - 60) + 0.33 S2E_j) \quad (3)$$

At the end of 2008 – the last year for which accurate data are available – Italy was the most indebted EU country. In its 2009 update of SCP, Italy declared MTOD of zero – *i.e.*, a balanced budget in structural terms –; since MTOMB is  $-1.4$  and MTOEA is  $-1$ , then we assume it should have been  $MTOD = 0 = MTOMS$ . Taking on board the values of  $g_j$ ,  $dj$ , and  $S2E_j$  for Italy reported in Table 2, the equation solves for the calibrated parameter  $k = 0.033$ .

The calibrated algorithm provides us with estimates of MTOMT and MTOSM, denoted MTOMT\* and MTOSM\*. Table 1 reports these estimates for EU countries together with their MTOD (if any). For the 15 countries that did declare MTO, two comparisons between MTOMT\* and MTOD give us some comfort about the reliability of our estimates in terms of approaching the true (undisclosed, unobserved) MTOMT. First, the condition  $MTOMT \leq MTOD$  must always hold and we find that our estimates do satisfy  $MTOMT^* \leq MTOD$  in 11 out of the 15 countries.<sup>4</sup> Second, using again an educated guess, a case can be made that countries would prefer either to declare MTOD very close to MTOMT – to gain as much fiscal space as possible, as argued before – or to declare MTOD well above MTOMT – to signal commitment towards fiscal discipline that might bring about gains in terms of market confidence and even financial stability.<sup>5</sup> MTOD being neither close nor far from MTOMT is unlikely to be a preferred option. Our estimates MTOMT\* indeed reproduce the case made for extreme options: leaving Luxembourg aside, in 7 out of 14 countries the MTOMT\* differs from MTOD by less than 0.3 percentage points – Germany, Ireland, Italy, Latvia, Hungary, Malta, Netherlands; in 6 countries the discrepancy between MTOMT\* and MTOD is larger than 1 percentage point – Bulgaria, Estonia, France, Austria, Finland, and Sweden –; and only in Poland the discrepancy of 0.5 percentage points is neither small nor large.

### 3.2 Strengths and weaknesses of the new MTO methodology

The new methodology for implementing MTO determination criteria certainly improves upon the ad hoc approach adopted in the past. The MTO methodology enhances the transparency, simplicity, and political commitment of the procedures for setting medium-term budgetary targets. MTOs are now embedded into a well-defined quantitative framework: for each EU country, precise values can be computed for the MTO minimum benchmark, the debt-stabilising budget balance, the supplementary debt-reduction effort, and the partial frontloading of the cost of ageing. Furthermore, MTOs give now an explicit role to government liabilities, both explicit and implicit,

<sup>4</sup> For Ireland, Hungary and Netherlands, our MTOMT\* only slightly exceeds the MTOD value or the lower bound of the MTOD range.

<sup>5</sup> A country announcing a commitment to a very demanding MTO – *i.e.*, well above MTOMT – may lack credibility and hence it makes no sense to make such announcement. In addition, there is the risk of declaring a too ambitious MTO and subsequently find that recovery falters and it is difficult – even undesirable – to deliver fiscal consolidation, which would undermine the confidence sought in the first place. We think these arguments apply to Italy and hence warrant the educated guess underlying the algorithm calibration, namely that this country has declared an MTOD close to MTOMT.

Table 1

**MTOMT\* vs MTOs declared in SCP 2009**  
(percent of GDP unless otherwise specified)

Country		Growth Rate of Potential GDP at Current Prices (average 2010-60, percent)	Budget Balance Stabilising Debt-to-GDP Ratio at 60 per cent <sup>(1)</sup>	Debt at End-2008	Estimated Supplementary Debt-reduction Effort <sup>(2)</sup>	S2E	MTOSM <sup>(3)</sup>	MTOMB	MTOEA	MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*)	MTO Declared by Country in SCP 2009 <sup>(4)</sup>
Belgium	BE	3.8	-2.2	89.8	1.0	4.8	0.3	-1.3	-1.0	0.3	no comm.
Bulgaria	BG	3.7	-2.1	14.1	0.0	1.5	-1.6	-1.8		-1.6	0.5
Czech Republic	CZ	3.6	-2.1	30.0	0.0	3.7	-0.9	-1.6		-0.9	no comm.
Denmark	DK	3.8	-2.2	33.4	0.0	1.4	-1.7	-0.5	-1.0	-0.5	no comm.
Germany	DE	3.2	-1.9	65.9	0.2	3.3	-0.6	-1.6	-1.0	-0.6	-0.5
Estonia	EE	3.8	-2.2	4.6	0.0	-0.1	-2.2	-1.9	-1.0	-1.0	0.0 or higher
Ireland	IE	4.4	-2.5	43.2	0.0	6.7	-0.3	-1.5	-1.0	-0.3	-0.5 to 0.0
Greece	EL	3.7	-2.1	99.2	1.3	11.5	3.0	-1.4	-1.0	3.0	no comm.
Spain	ES	3.9	-2.2	39.7	0.0	5.7	-0.4	-1.2	-1.0	-0.4	no comm.
France	FR	3.9	-2.2	67.4	0.2	1.8	-1.4	-1.6	-1.0	-1.0	0.0
Italy	IT	3.5	-2.0	105.8	1.5	1.5	-0.0	-1.4	-1.0	-0.0	0.0
Cyprus	CY	4.8	-2.7	48.4	0.0	8.3	0.0	-1.8	-1.0	0.0	n.a.
Latvia	LV	3.4	-2.0	19.5	0.0	1.0	-1.7	-2.0	-1.0	-1.0	-1.0
Lithuania	LT	3.5	-2.0	15.6	0.0	3.2	-1.0	-1.9	-1.0	-1.0	no comm.
Luxembourg	LU	4.6	-2.6	13.5	0.0	12.9	1.6	-1.0	-1.0	1.6	0.5
Hungary	HU	3.7	-2.1	72.9	0.4	1.5	-1.2	-1.6		-1.2	-1.5
Malta	MT	3.7	-2.1	63.6	0.1	5.7	-0.1	-1.7	-1.0	-0.1	0.0
Netherlands	NL	3.5	-2.0	58.2	0.0	5.0	-0.4	-1.1	-1.0	-0.4	-0.5 to 0.5
Austria	AT	3.7	-2.1	62.6	0.1	3.1	-1.0	-1.6	-1.0	-1.0	0.0
Poland	PL	3.5	-2.0	47.2	0.0	-1.2	-2.4	-1.5		-1.5	-1.0
Portugal	PT	3.9	-2.2	66.3	0.2	1.9	-1.4	-1.5	-1.0	-1.0	n.a.
Romania	RO	3.8	-2.2	13.6	0.0	4.9	-0.6	-1.8		-0.6	n.a.
Slovenia	SI	3.4	-2.0	22.5	0.0	8.3	0.7	-1.6	-1.0	0.7	no comm.
Slovakia	SK	3.7	-2.2	27.7	0.0	2.9	-1.2	-2.0	-1.0	-1.0	no comm.
Finland	FI	3.7	-2.1	34.2	0.0	4.5	-0.6	-1.2	-1.0	-0.6	0.5
Sweden	SE	3.9	-2.3	38.0	0.0	1.6	-1.7	-1.0		-1.0	1.0
United Kingdom	UK	4.1	-2.4	55.5	0.0	3.6	-1.2	-1.4		-1.2	no comm.

<sup>(1)</sup> Computed as  $-(60 \cdot g)/(1+g)$  where  $g$  is average nominal potential GDP growth rate over 2010-60. – <sup>(2)</sup> Computed as  $0.033 \cdot (d-60)$ , where  $d$  is 2008 debt as percent of GDP. – <sup>(3)</sup> Computed as  $-(60 \cdot g)/(1+g) + 0.033 \cdot (d-60) + 0.33 \cdot S2E$ . – <sup>(4)</sup> Declared MTO: “no comm.” indicates that no commitment is explicitly made by the country in the SCP 2009; “n.a.” indicates SCP 2009 is not available. Note: Luxembourg declared MTO is below MTOMT\* because the country opted to cover cost of ageing cumulated up to 2040.

Sources: Debt levels are from 2009 Updates of Stability and Convergence Program, submitted by countries in January 2010. Debt for Cyprus, Portugal, and Romania in 2012 is from European Commission's (2009) *Autumn Forecast*, and refers to 2011. Average nominal potential GDP growth rates over 2010-60 and *S2E* indicators are from European Commission's *Ageing Report 2009* and *Sustainability Report 2009*.

in the setting of minimum budgetary targets. MTOs, therefore, can modulate the constraints imposed on budgetary policies of a Member State to its own fiscal behaviour in the past – summarized by the current public debt level – as well as to its fiscal challenges in the future, especially the impact of ageing on public spending.

The consideration of explicit liabilities as determinants of MTOs involves a clear distinction between low-debt and high-debt countries and allows for a differentiated treatment of both groups. Low-debt countries are granted a larger margin of manoeuvre in managing government debt – for instance, to finance additional public investment. They are not seen as posing immediate threats for the macroeconomic and financial stability of E(M)U, and any slight increase in their debt levels is not perceived as a potential source of destabilising, cross-border, financial spillovers. High-debt countries, on the other hand, are required to achieve more demanding MTOs, which boils down to generate higher public savings – as proportion of GDP – in order to gradually reduce their debt ratios and the potential threats they entail to the E(M)U. The supplementary debt-reduction effort implements such a requirement in practice.

The introduction of implicit liabilities in the MTOs, in particular, ensures that a budgetary safety margin is being procured so as to cope with the projected increase in age-related expenditure. A full frontloading of the cost of ageing would pre-finance the whole expected increase in age-related expenditure over a long term horizon, whereas a partial frontloading implies that the remaining gap will have to be somehow financed later on – e.g., through the implementation of additional structural reforms to cut prospective spending, or the reduction of other public expenditures unrelated to social security, or the increase in taxes, or a mix of the previous alternatives. To acknowledge Member States' ownership on the choice of policies financing the cost of ageing, the new MTO methodology opted for a minimum, partial degree of frontloading (the coefficient  $k$  discussed above).

In the remaining part of this section, we assess critically the extent to which the specific modalities for introducing government liabilities into the MTO algorithm make a contribution to the preservation of long-term fiscal sustainability, which admittedly should be the ultimate goal of those modalities. Contrary to the great expectations created by the new MTO methodology, the analysis shows that, on the one hand, the supplementary debt-reduction effort does not accelerate significantly the convergence of debt-to-GDP ratios towards the Maastricht 60 per cent reference value and, on the other, the partial frontloading of cost of ageing falls short of providing enough incentives to undertake structural reforms to reduce the future path of age-related expenditure *vis-à-vis* the alternative of engaging in a standard medium-term consolidation process.

According to the supplementary debt-reduction effort in equation (2), for a high-debt country, a 10-percentage-point increase in the debt-to-GDP ratio raises the  $MTOSM^*$  by 0.33 percentage points of GDP, and, provided that  $MTOSM^*$  is the maximum in equation (1), it also raises the  $MTOMT^*$  by the same amount. To be sure, such an increase in the  $MTOMT^*$  represents a significant adjustment on the structural budget balance that should be achieved in the medium term. It is then apparent that the required effort penalizes high-debt countries and imposes the necessity of further fiscal tightening in the next few years.

But the stated purpose of the supplementary debt-reduction effort is to ensure rapid progress towards sustainability, not to penalize high-debt countries for its own sake by triggering further requirements of fiscal discipline. Therefore, an assessment of the effort on its own merits should be based on how much it accelerates convergence of the debt ratio towards the Maastricht 60 per cent reference value, and not on how much medium-term consolidation it requires from high-debt countries. In this regard, it turns out that the effort has little impact, if any, on the pace at which the debt-to-GDP of a high-debt country would decline over time if the MTO were reached as scheduled, and even if the MTO were permanently hit. In other words, the supplementary



debt-reduction effort is ineffective as a means of inducing convergence, as the simple debt dynamics exercise below illustrates.

Consider a high-debt country having representative values for all the relevant variables and parameters involved in the dynamics of public debt and the determination of MTOs: nominal GDP growth rate is constant at 3.5 per cent, nominal interest rate is 5 per cent, the S2E is constant at 2.5 per cent of GDP (as the simple average for Germany, France, Italy, and UK), MTOMB is  $-1.5$  per cent of GDP, and MTOEA is  $-1$  percent of GDP. The country inherits a level of debt that could be 70, 90, or 110 per cent of GDP. Assume that in each and every year, the country declares MTOD identical to the MTOMT and is always capable of achieving the committed target by running a structural budget balance in line with MTOMT. Finally, consider two algorithms for computing MTOMT: the first MTOMT is the current one adopted in the EU given by equation (3) with  $k=0.033$ ; the second MTOMT is similar to equation (3) but with  $k = 0$ , thus excluding the supplementary debt-reduction effort. The paths of debt-to-GDP ratio corresponding to the alternative initial debt levels and the two MTOMT algorithms are depicted in Figure 1. The paths of MTOMTs are depicted in Figure 2.

It is apparent that MTOMTs drive the dynamics of the debt ratios at any time. The MTOMT with supplementary debt-reduction effort initially follows the MTOSM, which is more demanding than MTOMB and MTOEA, and is updated periodically as the debt ratio declines over time; at some point, however, the MTOEA prevails and then MTOMT stabilises at  $-1$  percent of GDP. The MTOMT without the supplementary debt-reduction effort is always constant at the MTOEA of  $-1$  percent of GDP.

The exercise puts forward that the MTOMT with supplementary debt-reduction effort does not perform terribly better than the MTOMT without such effort in terms of inducing faster convergence of the debt-to-GDP ratios towards the 60 per cent value. For initial debt levels at 70 and 90 per cent of GDP, the paths of debt ratio for the two MTOMTs are almost indistinguishable. Starting with debt at 110 per cent of GDP, the MTOMT with effort needs 23 years to bring debt below 60 per cent of GDP, while the MTOMT without effort needs just 6 years more.

The intuition shown by the exercise can be extended to a formal argument: for high-debt countries the growth dividend largely dominates the net borrowing resulting from hitting MTOs and thus drives the pace of debt dynamics regardless of the size of MTOs. The argument indeed holds not only for very-high-debt countries but also for high-debt countries because both the MTOMT and the growth dividend are decreasing in the level of debt. Hence, for practical purposes, the inclusion of supplementary debt-reduction effort in the methodology for implementing the MTO determination criteria does little to ensure more rapid progress towards sustainability, *vis-à-vis* the exclusion of such effort. There is, on the other hand, the effect of imposing larger consolidation efforts in the medium term, but this is inconsistent with the purpose stated by the CoC.

Turning to the frontloading of the cost of ageing, it should be noted that explicit and implicit liabilities affect symmetrically the long-term solvency condition of the government. In the intertemporal budget constraint, the future increases in spending flows associated with ageing can be converted into a notional stock by computing net present values (NPV). That notional stock is fully comparable with the current stock of outstanding debt as both will imply the necessity of collecting taxes to pay for either additional primary spending or interests. For the same token, structural reforms that reduce future age-relating expenditure imply a reduction in the NPV of future spending flows that is comparable to a one-shot reduction in the outstanding debt stock.

The symmetry acknowledged in the solvency condition is absent in the MTO determination. Note first that the supplementary debt-reduction effort depends on the stock of explicit liabilities, while the frontloading of the cost of ageing is indeed a flow given by a proportion (say 0.33) of the

S2E indicator. Consider a country with a debt ratio of 100 per cent of GDP that undertakes pension reforms and improves permanently the primary balance-to-GDP ratio by 0.5 percentage points. The S2E indicator declines by a similar amount and hence the MTOMT would decrease by 0.17 percentage points through the frontloading of cost of ageing. Assuming the interest-growth differential to be constant at 1.5 per cent over time (as in the previous simulations), the NPV of the permanent improvement in the primary balance ratio is 33.3 per cent of GDP. Therefore, from the point of view of intertemporal solvency, the pension reforms deliver an improvement equivalent in NPV to a one-shot reduction in the outstanding debt of 33.3 percentage points of GDP. But as far as MTOMTs are concerned, such a one-shot reduction in the debt-to-GDP ratio would bring about a decline in MTOMT of 1.09 percentage points through the supplementary debt-reduction effort.

It is apparent then that, for a Member State considering a standard short-term budgetary consolidation that reduces the debt ratio against the alternative of launching a long-term

Figure 1

**Debt Paths Under MTOMT With and Without Supplementary Debt-reduction Effort SDRE**  
(percent of GDP)

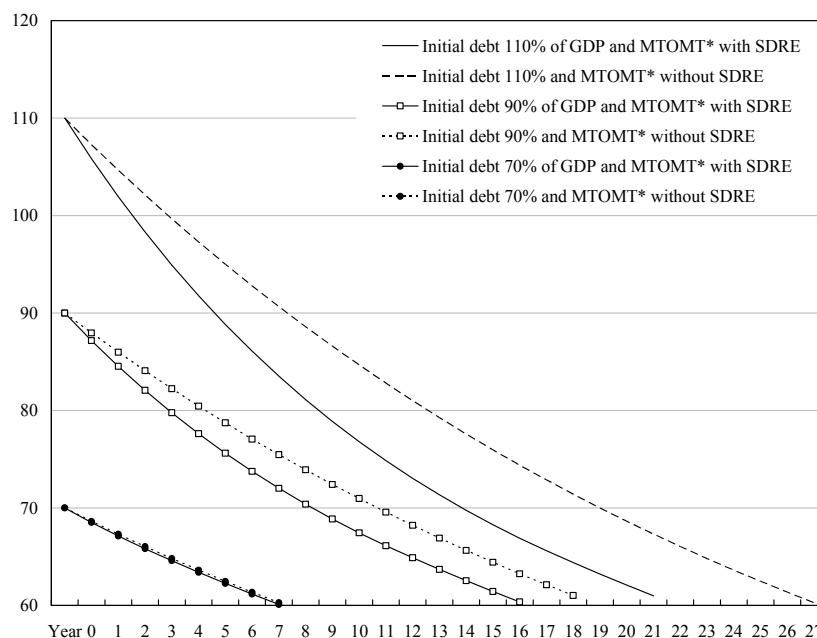
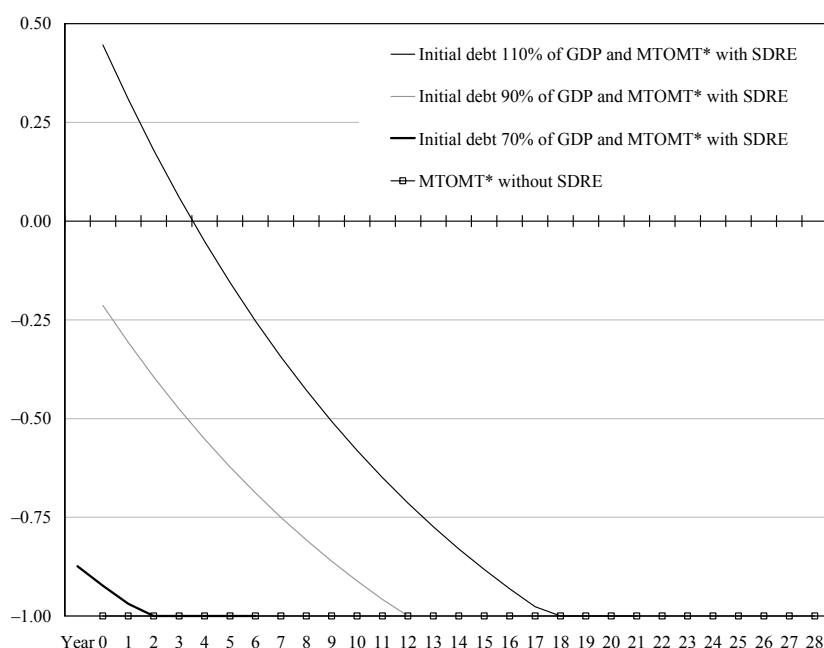


Figure 2

**Paths of MTOMT With and Without Supplementary Debt-reduction Effort SDRE**  
(percent of GDP)



structural reform, but both having the same impact on solvency, the MTOs do not offer a balanced incentives but a clear preference for consolidation and very limited gains for structural reforms. It might be argued that there are reasons why explicit and implicit liabilities are not directly comparable, but still the difference between the gains in terms of lower MTOs resulting from reducing one or the other (1.09 vs 0.17) is too large and probably unwarranted.

#### **4 The impact of the financial and economic crisis on MTOs**

The financial and economic crisis along with the expansionary policies undertaken to support aggregate demand have led to sizable budget deficits and borrowing needs. The budgetary outcomes are not expected to recover rapidly in the next few years and indeed the mounting debt levels will have to be carried over for many years. The severity of the 2008-09 crisis and the magnitude of the fiscal challenges going forward are apparent from a comparison between the SCP updates submitted by EU Member States in 2007, 2008, and 2009, in terms of declared MTOs, dates of achievement, and gaps between structural budget balances and MTOs (Table 2).

In the 2007 updates of SCP, submitted before the crisis unfolded, the expectation was that achieving MTOs would not be a too difficult task. In fact, all countries but UK declared MTOs and were committed to achieving them no later than 2012. There were 12 countries whose initial structural budget balance as of 2007 was already above the declared MTO value. Consolidation efforts were expected from the 14 countries with a 2007 budgetary position below MTO, but the required efforts were fairly small as the gap to be bridged by gradually improving structural budget balances over the programme period was less than 2.5 percentage points of GDP for 11 out of 14 cases. Overall, as early as 2010, three years after the update submission, as many as 17 countries would have achieved their committed MTOs.

The picture radically changed as EU Member States started to factor in the fiscal effects of the crisis and policy interventions. By the time of submitting the 2008 updates of SCP, the uncertainty of the environment and the difficulties to envisage future macroeconomic and policy scenarios induced EU countries to relax commitments on MTOs. Eventually they declared MTOs but postponed the date of achievement or refrained from committing themselves to any date. Only 5 out of 27 EU Member States indicated that their MTOs would be achieved throughout the programme period.

At present, the 2009 updates of SCP recently submitted are meant to incorporate at length the impact of the crisis on public finances and to discuss consolidation policies to be implemented to restore fiscal soundness, especially those EU Member States going through the excessive deficit procedure. The expectation now is that achieving MTOs in the aftermath of the crisis would be rather difficult and sizable consolidation efforts should be undertaken. On the one hand, as many as 13 EU countries have either refrained from declaring MTOs or failed to submit the SCP 2009 updates altogether. Reluctance to declare MTOs and achievement dates suggests that countries are seeking flexibility to modulate their exit strategies, whose short-run effects are certainly contractive, to the pace of the economic recovery, which is expected to be slow. On the other hand, there are 15 countries that declared MTOs but posted an initial structural budget balance in 2009 far below the MTO values, with the sole exception of Sweden. The political feasibility of the consolidation efforts needed to achieve the committed MTOs remains to be seen. Only a small handful of countries would reach their MTOs in 2012, three years after the update submission.<sup>6</sup>

<sup>6</sup> Several EU Member States countries have not declared MTOs so the gap to be bridged cannot be properly assessed. But if we consider the less demanding requirement on the budgetary targets, namely the MTOMBs whose representative value is around – 1.5 per cent of GDP, it turns out that the initial budgetary positions of EU countries incurring in structural deficits are, on average, 3.5 percentage points below the representative MTOMB.

Table 2

**Declared MTOs, Dates of Achievement and Gaps Between Structural Budget Balances and MTOs in SCP 2007, 2008 and 2009**  
(percent of GDP)

Country		SCP 2007							SCP 2008		SCP 2009						
		MTO Declared by Country <sup>(1)</sup>	Date to Achieve MTO <sup>(2)</sup>	Structural Balance 2007	Distance to MTO <sup>(3)</sup>	Structural Balance 2010	Distance to MTO <sup>(3)</sup>	Achievement of MTO by 2010?	MTO Declared by Country <sup>(1)</sup>	Date to Achieve MTO <sup>(2)</sup>	MTO Declared by Country <sup>(1)</sup>	Date to Achieve MTO <sup>(2)</sup>	Structural Balance 2009	Distance to MTO <sup>(4)</sup>	Structural Balance 2012	Distance to MTO <sup>(4)</sup>	Achievement of MTO by 2012?
Belgium	BE	0.5	2009	-0.3	-0.8	1.0	0.5	yes	0.5	n.d.	no comm.	n.d.	-3.7		-2.0		
Bulgaria	BG	1.5	2010	2.9	1.4	3.1	1.6	yes	1.5	t.p.p.	0.5	n.d.	-1.0	-1.5	1.0	0.5	yes
Czech Republic	CZ	-1.0	2012	-4.1	-3.1	-2.5	-1.5	no	-1.0	2012	no comm.	n.d.	-5.5		-2.6		
Denmark	DK	0.75 to 1.75	t.p.p.	3.5	2.3	2.5	1.3	yes	0.75 to 1.75	t.p.p.	no comm.	n.d.	-0.6		-0.8		
Germany	DE	0.0	2007	-0.3	-0.3	0.0	0.0	yes	0.0 to 0.5	n.d.	-0.5	n.d.	-1.5	-1.0	-3.0	-2.5	no
Estonia	EE	0.0	t.p.p.	1.2	1.2	1.3	1.3	yes	0.0	2011	0.0 or higher	n.d.	-0.8	-0.8	0.5	0.5	yes
Ireland	IE	0.0	2007	0.5	0.5	-0.7	-0.7	no	0.0 to 0.5	n.d.	-0.5 to 0.0	n.d.	-9.3	-9.0	-6.8	-6.6	no
Greece	EL	0.0	2012	-2.8	-2.8	-0.5	-0.5	no	0.0	n.d.	no comm.	n.d.	-7.8		-2.1		
Spain	ES	0.0	2007	2.2	2.2	1.9	1.9	yes	0.0	n.d.	no comm.	n.d.	-10.0		-4.6		
France	FR	0.0	2012	-2.0	-2.0	-1.0	-1.0	no	0.0	2012	0.0	n.d.	-5.8	-5.8	-2.8	-2.8	no
Italy	IT	0.0	2011	-2.2	-2.2	-0.5	-0.5	no	0.0	n.d.	0.0	n.d.	-3.6	-3.6	-2.0	-2.0	no
Cyprus	CY	0.0	2007	0.3	0.3	0.8	0.8	yes	0.0	n.d.	n.a.	n.d.	-3.4		na		
Latvia	LV	-1.0	t.p.p.	-0.5	0.5	1.7	2.7	yes	-1.0	n.d.	-1.0	n.d.	-8.1	-7.1	-0.5	0.5	yes
Lithuania	LT	-1.0	2009	-1.2	-0.2	1.1	2.1	yes	-1.0	2010	no comm.	n.d.	-7.5		-1.7		
Luxembourg	LU	-0.8	2007	0.7	1.5	1.6	2.4	yes	-0.8	n.d.	0.5	n.d.	0.4	-0.1	-4.0	-4.5	no
Hungary	HU	-0.5	n.d.	-4.8	-4.3	-2.5	-2.0	no	0.5	n.d.	-1.5	n.d.	-2.5	-1.0	-1.5	0.0	yes
Malta	MT	0.0	2010	-2.1	-2.1	0.1	0.1	yes	0.0	2011	0.0	n.d.	-3.3	-3.3	-3.3	-3.3	no
Netherlands	NL	-1.0 to -0.5	t.p.p.	-0.3	0.5	0.8	1.6	yes	-0.5 to -1.0	t.p.p.	-0.5 to 0.5	n.d.	-3.5	-3.5	-3.6	-3.6	no
Austria	AT	0.0	2010	-0.7	-0.7	0.1	0.1	yes	0.0	n.d.	0.0	n.d.	-2.6	-2.6	-2.4	-2.4	no
Poland	PL	-1.0	2011	-2.4	-1.4	-1.1	-0.1	no	-1.0	2012	-1.0	n.d.	-7.1	-6.1	-2.9	-1.9	no
Portugal	PT	-0.5	2010	-2.1	-1.6	-0.3	0.2	yes	-0.5	n.d.	n.a.	n.d.	-6.6		na		
Romania	RO	-0.9	n.d.	-3.4	-2.5	-2.7	-1.8	no	-0.9	2012	n.a.	n.d.	-7.1		na		
Slovenia	SI	-1.0	t.p.p.	-0.8	0.2	-0.1	0.9	yes	-1.0	n.d.	no comm.	n.d.	-4.8		-2.1		
Slovakia	SK	-1.0 or higher	2010	-3.0	-2.0	-1.2	-0.2	no	-1.0	2010	no comm.	n.d.	-5.2		-2.6		
Finland	FI	2.0	t.p.p.	4.2	2.2	2.8	0.8	yes	2.0	t.p.p.	0.5	n.d.	0.3	-0.2	-1.0	-1.5	no
Sweden	SE	1.0	t.p.p.	2.4	1.4	3.4	2.4	yes	1.0	t.p.p.	1.0	n.d.	1.4	0.4	0.6	-0.4	no
United Kingdom	UK	no comm.	n.d.	-3.0		-1.9			no comm.	n.d.	no comm.	n.d.	-9.0		-4.7		

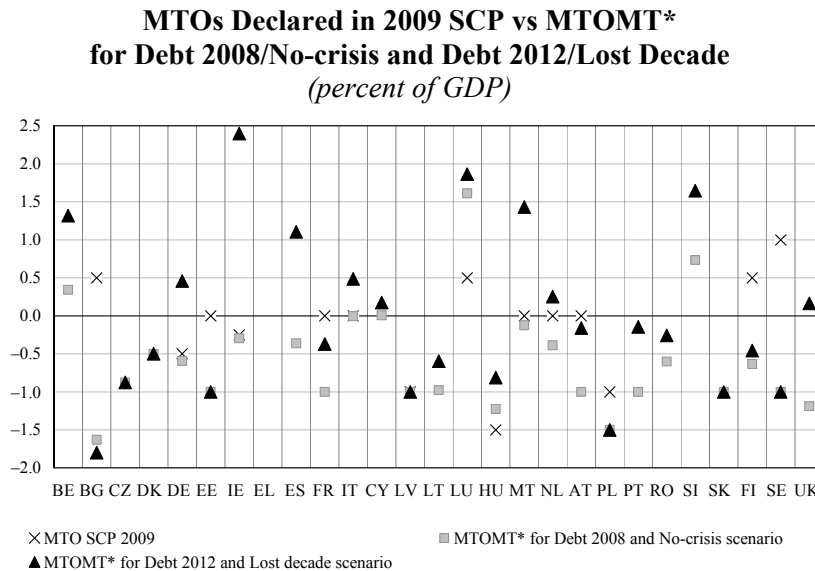
<sup>(1)</sup> Declared MTO: “no comm.” indicates that no commitment is explicitly made by the country in the SCP; “n.a.” indicates SCP is not available. – <sup>(2)</sup> Date to achieve MTO: “n.d.” indicates that the date of achievement is not declared in the SCP; “t.p.p.” indicates the MTO is achieved throughout the programme period; “n.a.” indicates the SCP is not available. – <sup>(3)</sup> For Denmark and Netherlands, distance to the central point of MTO range; for Slovakia, distance to the minimum value of MTO range. – <sup>(4)</sup> For Ireland and Netherlands, distance to the central point of MTO range; for Estonia, distance to the minimum value of MTO range.

Sources: SCP 2007's declared MTO and structural balances are from European Commission's *Public Finances in EMU 2008*, p. 37 and country annexes respectively.

SCP 2008's declared MTO are from 2008 Updates of Stability and Convergence Program.

SCP 2009's declared MTO and structural balances are from 2009 Updates of Stability and Convergence Program, submitted by countries in January 2010.

Figure 3



In any case, it must be recognized that the credibility of MTOs as constraints on medium-term fiscal policies has been undermined since the beginning of the crisis, either because countries are not committed to achieve any target or because they are committed to achieve too ambitious targets.

The current MTOs declared in the 2009 updates of SCP have been set using: (i) the debt stocks at the end of

2008, which for practical purposes should be deemed pre-crisis levels, and (ii) the AWG projections of potential growth and age-related expenditure covering 2008-60 elaborated before the crisis (denoted “no-crisis scenario”), which are involved in computing both the debt-stabilising budget balance and the partial frontloading of cost of ageing. But in the next few years, naturally, the crisis will have changed these elements and MTOs will have to be adjusted accordingly (Table 3). To gauge the MTO values that could be established in the next revision scheduled by 2012, we construct an alternative scenario based: (i) debt projections for 2012 reported by EU countries in their SCP 2009 updates, and (ii) the AWG projections under the “lost decade scenario”.<sup>7</sup>

Figure 3 reports the current MTOs – if declared – along with our estimates MTOMT\* for the prospective alternative scenario. Our estimates give an order of magnitude of the overall impact on MTOs of the crisis, mediated through the explosion of debt and the rise in implicit liabilities due to lower potential growth and higher cost of ageing, if the lost decade scenario were to materialize. There are 19 countries with MTOMT\*s for the alternative scenario that exceed the MTOMT\* underlying the current MTOs. Belgium, Germany, Ireland, Spain, Malta, Portugal, Slovenia, and UK are those with the largest increases of MTOMT\* in the alternative scenario *vis-à-vis* the current situation. The cases of Ireland and Spain are particularly worrisome because both explicit and implicit liabilities rise significantly.

MTOs cannot be below the true MTOMT that we try to estimate through MTOMT\* and we note that future MTOMT\* are much higher than current MTOMT\*. Therefore, our analysis suggests that, conditional upon the materialization of the underlying projections on debt and potential growth, a tightening on MTOs is a likely outcome of the next round of revisions around 2012. The debate on exit strategies for EU Member States should then take on board that MTOs based on the new methodology will become more demanding in the future following the deterioration of public finance conditions already taking place.

<sup>7</sup> AWG has recently made available an alternative set of projections of growth and age-related expenditure that do take the crisis on board and explore different paths of recovery; among them, the so-called “lost decade scenario” envisages lower growth rates of potential GDP for all EU countries until 2020 *vis-à-vis* the “no-crisis scenario”. Because of institutional features of pension and health systems, a sufficiently long period of lower output levels could give rise to a tilted, upward shift in the path of age-related expenditures as proportion of GDP, eventually increasing the cost of ageing (European Commission, 2009b; European Commission and Economic Policy Committee, 2009).

Table 3

**MTOMT\* Under Debt as of 2008 and 2012 and No-crisis and Lost Decade Scenarios**  
(percent of GDP unless otherwise specified)

Country		Growth Rate of Potential GDP at Current Prices (average 2010-60, percent)		Budget Balance Stabilising Debt-to-GDP Ratio at 60 per cent in scenario ...		Debt		Supplementary Debt-reduction effort (Calibrated) for Debt as of ...		S2E		MTOSM* for No-crisis Scenario and Debt as of ...		MTOSM* for Lost Decade Scenario and Debt as of ...		MTOMB	MTOEA	MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) for No-crisis Scenario and Debt as of ...		MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) for Lost Decade Scenario and Debt as of ...	
		NCS	LDS	NCS	LDS	2008	2012	2008	2012	NCS	LDS	2008	2012	2008	2012			2008	2012	2008	2012
Belgium	BE	3.8	3.7	-2.2	-2.1	89.8	100.6	1.0	1.3	4.8	6.4	0.3	0.7	1.0	1.3	-1.3	-1.0	0.3	0.7	1.0	1.3
Bulgaria	BG	3.7	3.6	-2.1	-2.1	14.1	14.4	0.0	0.0	1.5	0.8	-1.6	-1.6	-1.8	-1.8	-1.8		-1.6	-1.6	-1.8	-1.8
Czech Republic	CZ	3.6	3.6	-2.1	-2.1	30.0	42.0	0.0	0.0	3.7	3.7	-0.9	-0.9	-0.9	-0.9	-1.6		-0.9	-0.9	-0.9	-0.9
Denmark	DK	3.8	3.7	-2.2	-2.1	33.4	48.3	0.0	0.0	1.4	1.2	-1.7	-1.7	-1.7	-1.7	-0.5	-1.0	-0.5	-0.5	-0.5	-0.5
Germany	DE	3.2	3.1	-1.9	-1.8	65.9	81.0	0.2	0.7	3.3	4.8	-0.6	-0.1	0.0	0.5	-1.6	-1.0	-0.6	-0.1	0.0	0.5
Estonia	EE	3.8	3.5	-2.2	-2.1	4.6	14.2	0.0	0.0	-0.1	-0.5	-2.2	-2.2	-2.2	-2.2	-1.9	-1.0	-1.0	-1.0	-1.0	-1.0
Ireland	IE	4.4	4.1	-2.5	-2.4	43.2	83.9	0.0	0.8	6.7	12.1	-0.3	0.5	1.6	2.4	-1.5	-1.0	-0.3	0.5	1.6	2.4
Greece	EL	3.7	3.6	-2.1	-2.1	99.2	117.7	1.3	1.9	11.5	10.7	3.0	3.6	2.7	3.3	-1.4	-1.0	3.0	3.6	2.7	3.3
Spain	ES	3.9	3.8	-2.2	-2.2	39.7	74.1	0.0	0.5	5.7	8.6	-0.4	0.1	0.6	1.1	-1.2	-1.0	-0.4	0.1	0.6	1.1
France	FR	3.9	3.7	-2.2	-2.2	67.4	87.1	0.2	0.9	1.8	2.7	-1.4	-0.7	-1.0	-0.4	-1.6	-1.0	-1.0	-0.7	-1.0	-0.4
Italy	IT	3.5	3.3	-2.0	-1.9	105.8	114.6	1.5	1.8	1.5	1.9	0.0	0.3	0.2	0.5	-1.4	-1.0	0.0	0.3	0.2	0.5
Cyprus	CY	4.8	4.6	-2.7	-2.6	48.4	63.4	0.0	0.1	8.3	8.2	0.0	0.1	0.1	0.2	-1.8	-1.0	0.0	0.1	0.1	0.2
Latvia	LV	3.4	3.2	-2.0	-1.8	19.5	56.8	0.0	0.0	1.0	1.5	-1.7	-1.7	-1.3	-1.3	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0
Lithuania	LT	3.5	3.2	-2.0	-1.8	15.6	41.0	0.0	0.0	3.2	3.8	-1.0	-1.0	-0.6	-0.6	-1.9	-1.0	-1.0	-1.0	-0.6	-0.6
Luxembourg	LU	4.6	4.5	-2.6	-2.6	13.5	29.3	0.0	0.0	12.9	13.5	1.6	1.6	1.9	1.9	-1.0	-1.0	1.6	1.6	1.9	1.9
Hungary	HU	3.7	3.4	-2.1	-2.0	72.9	73.6	0.4	0.4	1.5	2.2	-1.2	-1.2	-0.8	-0.8	-1.6		-1.2	-1.2	-0.8	-0.8
Malta	MT	3.7	3.5	-2.1	-2.0	63.6	67.3	0.1	0.2	5.7	9.7	-0.1	0.0	1.3	1.4	-1.7	-1.0	-0.1	0.0	1.3	1.4
Netherlands	NL	3.5	3.4	-2.0	-2.0	58.2	73.0	0.0	0.4	5.0	5.5	-0.4	0.0	-0.2	0.3	-1.1	-1.0	-0.4	0.0	-0.2	0.3
Austria	AT	3.7	3.6	-2.1	-2.1	62.6	73.8	0.1	0.5	3.1	4.5	-1.0	-0.6	-0.5	-0.2	-1.6	-1.0	-1.0	-0.6	-0.5	-0.2
Poland	PL	3.5	3.3	-2.0	-2.0	47.2	55.8	0.0	0.0	-1.2	-1.4	-2.4	-2.4	-2.4	-2.4	-1.5		-1.5	-1.5	-1.5	-1.5
Portugal	PT	3.9	3.8	-2.2	-2.2	66.3	91.1	0.2	1.0	1.9	3.1	-1.4	-0.6	-1.0	-0.1	-1.5	-1.0	-1.0	-0.6	-1.0	-0.1
Romania	RO	3.8	3.6	-2.2	-2.1	13.6	31.3	0.0	0.0	4.9	5.6	-0.6	-0.6	-0.3	-0.3	-1.8		-0.6	-0.6	-0.3	-0.3
Slovenia	SI	3.4	3.5	-2.0	-2.0	22.5	42.7	0.0	0.0	8.3	11.1	0.7	0.7	1.6	1.6	-1.6	-1.0	0.7	0.7	1.6	1.6
Slovakia	SK	3.7	3.8	-2.2	-2.2	27.7	42.2	0.0	0.0	2.9	2.9	-1.2	-1.2	-1.2	-1.2	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0
Finland	FI	3.7	3.6	-2.1	-2.1	34.2	54.4	0.0	0.0	4.5	4.9	-0.6	-0.6	-0.5	-0.5	-1.2	-1.0	-0.6	-0.6	-0.5	-0.5
Sweden	SE	3.9	3.8	-2.3	-2.2	38.0	45.2	0.0	0.0	1.6	3.1	-1.7	-1.7	-1.2	-1.2	-1.0		-1.0	-1.0	-1.0	-1.0
United Kingdom	UK	4.1	4.0	-2.4	-2.3	55.5	90.9	0.0	1.0	3.6	4.4	-1.2	-0.2	-0.9	0.2	-1.4		-1.2	-0.2	-0.9	0.2

NCS = No-crisis scenario, LDS = Lost Decade scenario.

Sources: Debt levels are from 2009 Updates of Stability and Convergence Program, submitted by countries in January 2010.

Debt for Cyprus, Portugal and Romania in 2012 is from European Commission (2009), *Autumn Forecast*, and refers to 2011.

For both no-crisis and lost decade scenarios, the average nominal potential GDP growth rates over 2010-60 and S2E indicators are from European Commission's Ageing Report 2009 and Sustainability Report 2009.

## 5 An alternative method for the supplementary debt-reduction effort based on an exposure index

On theoretical grounds, an important feature of the new MTO methodology is that it establishes a link among three issues involved in the conduct of fiscal policy and the setting of credible budgetary targets: the amount of outstanding debt, the existence of implicit liabilities, and the determination of possible leeway to undertake discretionary measures and public investment. On practical grounds, nevertheless, the advantages of the MTO methodology have been severely undermined by the current crisis and the discretionary policies deployed to cope with it inasmuch as debt ratios have skyrocketed and eventually overshadowed any other variable in the determination of MTOs. In this particular crisis, the increase in explicit liabilities during 2008-09 has not been a consequence of profligate governments but of governments coping either with the collapse of an unsustainable debt-led growth process at home (UK, Ireland) or with the contraction of output due to the collapse in international trade (Germany, Italy). In such a context, focusing narrowly on the level of public debt may not be sufficient to address the stance of fiscal policy in order to set MTOs. Characteristics of the public debt, the performance of financial and banking system, and sectoral and external imbalances may all be important and worth considering in assessing the fiscal stance in the short- and medium-term.

In this section, we elaborate an alternative formulation for MTOs in which the supplementary debt-reduction effort is replaced by a synthetic exposure index that measures funding pressures and risks facing all sectors in a given country at a certain point in time. The exposure index not only includes the public debt-to-GDP ratio but also several variables related to the short-term sustainability of public debt, the risk of distress in the financial and banking system – and thus the implicit liabilities for the public sector associated to possible bail-outs, and the build-up of sectoral and external imbalances. A similar analysis has been recently carried out by the European Commission (2010).

For the public sector, we consider the composition of debt in terms of residual maturity and the share held by non-resident investors. Maturity composition is gauged by the stock of government liabilities coming due in the next three years, which simultaneously measures short-term refinancing needs and is a proxy for rollover risk facing the government. The share of foreign holdings of public debt assesses the reliance of the government on foreign savings to place debt in the market, as well as its exposure to a situation where investors increase home bias.

The banking sector's risk exposure on assets is assessed focusing on debtors' characteristics to emphasize counterparty risk. We first separate credit extended to domestic agents and to foreigners. Within domestic debtors, we consider the share of loans given to households and to corporates, whereas within foreign debtors, we consider the share of loans given to residents of emerging markets and to residents of developed countries. Funding pressures facing the banking sector, on the other hand, is gauged by the banks' total debt, the share of debt maturing in the next three years, and the ratio between total domestic loans and domestic deposits. The latter is a sort of funding gap measuring the reliance of the banking system on the wholesale funding markets, as well as its exposure to a situation where these markets dry up.

As far as sectoral imbalances are concerned, we consider the net borrowing position of four sectors – households, non-financial corporate, financial corporate, and the general government – as an indicator of their financing needs originated in income-expenditure imbalances. External imbalances are assessed using the net borrowing position of the economy as a whole – *i.e.*, the current account – and the debt composition by maturity aggregated across the aforementioned four sectors. The two indicators measure the funding pressures facing the country – arising from income-expenditure imbalances and short-term refinancing needs – and reflect the country's exposure to a liquidity crisis or sudden stops.

### 5.1 Data and results

For the variables described above, we collected data corresponding to the main 10 Euro Area countries in 2005 – well before the start of the crisis – and 2009, the last year in terms of data availability.<sup>8</sup> All variables are expressed in terms of GDP. We then selected six sub-indices addressing the exposure of public sector, the composition of foreign assets, domestic assets, and liabilities of the banking sector, and the sectoral net borrowing and debt composition of the four sectors mentioned above. For each sub-index we ranked the performance of all countries from the best grading 1 to the worst performer grading 10. We averaged (without weighting) the single sub-component scores along all the dimensions under study and ranked the countries accordingly.

The resulting ranking constitutes the exposure index, giving 1 to the best performer and 10 to the worst. The higher the value assigned by the indicator to a country, the more exposed the country is from a financial and fiscal point of view. Thus, the exposure index intends to provide an easy read of each country's fiscal and financial position relative to its peers within the Euro Area. In addition, as the exposure indicator summarizes variables associated with the funding pressures of the four sectors, it can be seen as measuring the outstanding amount of public as well as private liabilities in the economy. The exposure index and the underlying sub-indicators are reported in Table 4.

As far as the public debt sub-index is concerned, Italy and Greece rank poorly. Italy presents the highest debt in 2009 but performs relatively well in terms of the share of debt held by foreigners. By contrast, Greece presents a slightly lower public debt in 2009 with a similar maturity composition as the Italian one, but features a larger foreign exposition. From 2005 to 2009, the relative position of Portugal deteriorates due to the increase in the level of public debt, whereas the positions of Belgium and the Netherlands worsen on the account of higher debt held abroad. In spite of the increase in the debt-to-GDP ratio in 2009, the relative average positions of Germany, Ireland, and France stay constant, whereas the overall condition for Austria improves.

The bank loan exposure to foreign countries (second sub-index) is a useful indicator of the degree of financial internationalization. However, in times of crisis, it becomes a good proxy of the risk of financial contagion. In 2009, Ireland scores high in terms of banking sector exposure to advanced economies whereas Austria is largely exposed towards emerging markets. Looking at the domestic bank exposure (third sub-index), Ireland and Spain lead the ranking with respect to peer countries. The sub-index on the banking sector funding measure stress felt by banks in case of a liquidity crisis or a depositors run. Ireland is again the most exposed country in 2009, followed by Spain and the Netherlands.

The analysis of sectoral balances (fifth sub-index) shows that Greece is again the worst performer in 2009, with imbalances in both households and the government leading to a large current account deficit. Portugal and Ireland also perform poorly with sizable government borrowing and external imbalances. Sectoral short-term refinancing needs indicator (last sub-index) rank Ireland and Portugal as the most exposed economies in 2009, given their high stocks of

<sup>8</sup> Data for GDP and public debt are from AMECO. The figures on the “share of public debt maturing in the following 3 year” and the “Foreign holding of public debt” are either from national Central Banks’ or National Debt Management Bodies or National Treasury sources. Data on the “Banking Sector, loan exposure to foreign debtors” are from BIS (Consolidated foreign claims of reporting banks - ultimate risk basis). As they are expressed in million of dollar the ratio with respect to GDP has been obtained using IMF GDP in PPS (WEO database). Data on “Banking Sector, loan, exposure to domestic debtors” are from, ECB, Money, banking and financial markets, MFI balance sheets. Data on Banking sector funding are from ECB, Money, banking and financial markets, MFI balance sheets as far as the ratio between loan and deposit is concerned. Debt securities outstanding as well as Debt securities maturing in the following 3 year are from national Central Banks and National Treasury databases. Data on sectoral net borrowing are from AMECO. Data on sectoral short-term refinancing needs are from national central banks or treasuries as far as the series of “Financial Corporates Bonds”, “Non-financial Corporates – Bonds” and “General Government short-term share of public debt” are concerned. Data on Non-financial corporate (loans) and on short-term household loans are from Eurostat, financial Accounts Database.



short-term debt held by financial corporates, non-financial corporate, and households. Italy follows due to the high amount of outstanding short-term public debt.

The exposure index at the bottom of Table 4 shows that from 2005 to 2009 Ireland has worsened significantly as a consequence of imbalances borne by the household and financial corporate sectors. By contrast, the relative positions of Italy and Greece have deteriorated mainly on the account of the increasing public debt. But since the exposure indicator for Italy does not signal any particular stress in the financial corporate's and households' indebtedness, the country exhibits middle risk.

## 5.2 *Applying the exposure index to the new MTO calculation*

The fiscal and financial exposure index can be used to rank all countries on a 0-1 interval, as presented in Table 5. In order to compute minimum budgetary targets MTOMT\*s taking on board a wider range of liabilities as well as sectoral and external imbalances, we use the exposure index in substitution of the (calibrated) supplementary debt-reduction effort (Table 5). On average, MTOMT\*s with exposure index are more or less demanding depending on the assessment of imbalances in the banking, financial corporate, and household sectors. High-debt countries with low underlying sectoral imbalances converge to a minimum budgetary target less stringent than what estimated using the supplementary debt-reduction effort.

Under the no-crisis scenario, Germany, the country with the less worrying sectoral imbalances, has an MTOMT\* with exposure index less demanding than the MTOMT\* with supplementary debt-reduction effort (−0.8 per cent of GDP rather than −0.6 per cent). Compared to the MTO declared in the 2009 update of SCP, this result would assure to German authorities some additional leeway for expansionary fiscal policy in case of need. For Italy, an economy with high-debt but limited sectoral imbalances, our alternative methodology implies a less demanding MTOMT\* (−1 per cent of GDP instead of a balanced positions). The difference is substantial as it would allow to Italy to save, *ceteris paribus*, two years of the 0.5 percentage points consolidation required by the SGP. By contrast, the introduction of the exposure index would require a much tighter MTOMT\* for Ireland (0.7 per cent of GDP against −0.3 per cent). Being an economy characterized by low public debt but with large external imbalances and refinancing needs, fiscal policy should consolidate to improve public finances but also to reduce persistent external imbalances.

## 6 **Conclusions**

The objective of this paper has been threefold. Firstly, by relying on the information contained in the last batch of the SCPs, it analyzed the new MTO methodology recently adopted by EU Member States on the basis of a calibrated algorithm that closely follows the still undisclosed formulation on which Member States agreed upon. In this framework, the most critical aspects regarding the modalities to take on board government liabilities have then been extensively discussed. Secondly, it presented an assessment of the impact of the current crisis on the modalities for determining MTOs. Current and future lower bounds for MTOs have been calculated measuring the incidence on the budgetary targets of changes in public debt, potential growth, and the projected cost of ageing. Thirdly, relying on the presumption that the new MTO methodology focus only on a handful of fiscal and growth variables and neglects other important determinants affecting the short-term sustainability of public finances, the paper has outlined a simple alternative modality to introduce into the MTO determination other elements connected with the building-up of external and domestic imbalances. The proposed modality to take into account of such explicit

Table 4

## Ranking of Countries and the Composition of the Exposure Index

	Year	BE	DE	IE	EL	ES	FR	IT	NL	AT	PT
Public Sector	Public Debt										
	2009	8	5	3	9	1	6	10	2	4	7
	2005	8	7	1	9	2	6	10	3	5	4
	Share of Debt Maturing in the Following 3 Years										
	2009	9	4	2	8	3	7	10	5	1	6
	2005	9	4	3	2	5	10	7	6	1	8
	Foreign Holdings of Public Debt										
	2009	5	4	8	7	3	6	2	9	1	10
Banking Sector - Loan Exposure to Foreign Debtors	2005	4	2	9	7	3	5	1	6	8	10
	Relative Position Average										
	2009	7.3	4.3	4.3	8.0	2.3	6.3	7.3	5.3	2.0	7.7
	2005	7.0	4.3	4.3	6.0	3.3	7.0	6.0	5.0	4.7	7.3
	Developed Countries										
	2009	8	6	10	1	5	7	2	9	4	3
	2005	9	8	1	2	5	7	3	10	6	4
	Emerging Markets										
Banking Sector - Loan Exposure to Domestic Debtors	2009	9	2	5	6	8	4	1	7	10	3
	2005	7	4	1	3	8	5	2	9	10	6
	Relative Position Average										
	2009	8.5	4	7.5	3.5	6.5	5.5	1.5	8	7	3
	2005	8	6	1	2.5	6.5	6	2.5	9.5	8	5
	Households										
	2009	2	6	10	3	9	5	1	7	4	8
	2005	3	7	9	2	6	4	1	10	5	8
Banking Sector Funding	Corporates										
	2009	1	2	10	3	9	4	5	7	6	8
	2005	1	4	10	3	8	2	5	6	7	9
	Relative Position Average										
	2009	1.5	4.0	10.0	3.0	9.0	4.5	3.0	7.0	5.0	8.0
	2005	2.0	5.5	9.5	2.5	7.0	3.0	3.0	8.0	6.0	8.5
	Loan/Deposit Ratio										
	2009	1	3	10	2	5	7	9	6	4	8
Sectoral Net Borrowing	2005	1	3	9	2	6	5	10	8	4	7
	Debt Securities Outstanding										
	2009	2	5	9	1	6	3	4	10	7	8
	2005	3	5	9	1	7	2	4	10	6	8
	Debt Securities Maturing in the Following 3 Years										
	2009	1	3	9	4	6	2	5	10	7	8
	2005	3	6	9	1	8	2	4	10	5	7
	Relative Position Average										
Sectoral Short-term Refinancing Needs	2009	1.3	3.7	9.3	2.3	5.7	4.0	6.0	8.7	6.0	8.0
	2005	2.3	4.7	9.0	1.3	7.0	3.0	6.0	9.3	5.0	7.3
	Non-financial Corporations										
	2009	5	4	2	3	7	6	9	1	8	10
	2005	3	5	4	2	10	8	7	1	6	9
	Households and NPISH										
	2009	7	3	6	10	1	4	5	9	2	8
	2005	6	1	9	10	8	4	3	7	2	5
Exposure Index	General Government										
	2009	5	1	9	10	8	7	4	3	2	6
	2005	5	7	1	9	2	6	8	3	4	10
	ROW - Current Account										
	2009	4	1	7	10	8	6	5	2	3	9
	2005	3	2	7	10	8	6	5	1	4	9
	Relative Position Average										
	2009	5.3	2.3	6.0	8.3	6.0	5.8	5.8	3.8	3.8	8.3
Relative Position	2005	4.3	3.8	5.3	7.8	7.0	6.0	5.8	3.0	4.0	8.3
	Financial Corporates - Bonds										
	2009	1	3	9	4	6	2	5	10	7	8
	2005	3	6	9	1	8	2	4	10	5	7
	Non-financial Corporates - Bonds										
	2009	4	9	6	3	2	10	5	7	1	8
	2005	3	9	2	7	4	10	6	8	1	5
	Non-financial Corporates - Loans										
Relative Position	2009	8	1	10	2	5	6	9	3	4	7
	2005	9	1	10	3	5	4	8	6	2	7
	Households										
	2009	1	3	10	9	5	2	4	6	7	8
	2005	1	5	10	9	3	2	4	6	8	7
	General Government										
	2009	9	4	2	8	3	7	10	5	1	6
	2005	9	4	3	2	5	10	7	6	1	8
	Relative Position Average										
	2009	4.6	4	7.4	5.2	4.2	5.4	6.6	6.2	4	7.4
	2005	5	5	6.8	4.4	5	5.6	5.8	7.2	3.4	6.8
Exposure Index											
Exposure Index	2009	4.8	3.7	7.4	5.0	5.6	5.2	5.0	6.5	4.6	7.1
	2005	4.8	4.9	6.0	4.1	6.0	5.1	4.8	7.0	5.2	7.2
Relative Position	2009	3	1	10	5	7	6	4	8	2	9
	2005	2	4	8	1	7	5	3	9	6	10

Table 5

**MTOMT\* Using Exposure Index**  
(percent of GDP unless otherwise specified)

Country		Growth rate of Potential GDP at Current Prices, Average 2010-60 (percent)		Budget Balance Stabilising Debt-to-GDP Ratio at 60 Per Cent		Exposure Index	S2E		MTOSM* Using Exposure Index		MTOMB	MTOEA	MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) Using Exposure Index		MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) Using Supplementary Debt-reduction Effort		MTO Declared by Country in SCP 2009 <sup>(1)</sup>
		No-crisis scen.	Lost decade scen.	No-crisis scen.	Lost decade scen.		No-crisis scen.	Lost decade scen.	No-crisis scen.	Lost decade scen.			No-crisis scen.	Lost decade scen.	No-crisis scen.	Lost decade scen.	
Belgium	BE	3.8	3.7	-2.2	-2.1	0.3	4.8	6.4	-0.3	0.3	-1.3	-1.0	-0.3	0.3	0.3	1.0	no comm.
Germany	DE	3.2	3.1	-1.9	-1.8	0.0	3.3	4.8	-0.8	-0.2	-1.6	-1.0	-0.8	-0.2	-0.6	0.0	-0.5
Ireland	IE	4.4	4.1	-2.5	-2.4	1.0	6.7	12.1	0.7	2.6	-1.5	-1.0	0.7	2.6	-0.3	1.6	-0.5 to 0.0
Greece	EL	3.7	3.6	-2.1	-2.1	0.4	11.5	10.7	2.1	1.8	-1.4	-1.0	2.1	1.8	3.0	2.7	no comm.
Spain	ES	3.9	3.8	-2.2	-2.2	0.5	5.7	8.6	0.2	1.2	-1.2	-1.0	0.2	1.2	-0.4	0.6	no comm.
France	FR	3.9	3.7	-2.2	-2.2	0.4	1.8	2.7	-1.2	-0.8	-1.6	-1.0	-1.0	-0.8	-1.0	-1.0	0.0
Italy	IT	3.5	3.3	-2.0	-1.9	0.4	1.5	1.9	-1.2	-1.0	-1.4	-1.0	-1.0	-1.0	0.0	0.2	0.0
Netherlands	NL	3.5	3.4	-2.0	-2.0	0.7	5.0	5.5	0.4	0.6	-1.1	-1.0	0.4	0.6	-0.4	-0.2	-0.5 to 0.5
Austria	AT	3.7	3.6	-2.1	-2.1	0.2	3.1	4.5	-0.9	-0.4	-1.6	-1.0	-0.9	-0.4	-1.0	-0.5	0.0
Portugal	PT	3.9	3.8	-2.2	-2.2	0.9	1.9	3.1	-0.7	-0.2	-1.5	-1.0	-0.7	-0.2	-1.0	-1.0	n.a.

<sup>(1)</sup> Declared MTO: "no comm." indicates that no commitment is explicitly made by the country in the SCP; "n.a." indicates SCP is not available.

Sources: For both no-crisis and lost decade scenarios, the average nominal potential GDP growth rates over 2010-60 and S2E indicators are from European Commission's *Ageing Report 2009* and *Sustainability Report 2009*.

current liabilities is based on the construction of an exposure indicator that adopts a simple metric – based on a number of variables such as the composition of public debt by maturity, the structure of the private sector indebtedness, and financial market judgements – and allows for easily ranking countries along different fiscal and financial dimensions.

Our results show that the new MTO values heavily depend on the current debt ratios. Given the relevance of this channel, the credibility of the medium-term fiscal targets is chiefly influenced by the consolidation of current budget balances. Such a consolidation, on the other hand, may eventually be procyclical in coincidence with the large slumps of the economy in the present. By contrast, the new MTO formulation gives less incentive to undertake structural reforms which may contain the projected increase in age-related expenditure and reduce non-contractual future spending commitments without necessarily adjusting current budget balances.

Furthermore, by analysing what reported in 2009 SCPs, the paper showed that, due to the impact of the crisis, EU Member States reacted either delaying the date of achievement of MTOs or even not declaring them. In this respect, the new MTOs methodology appears as being quite sensitive to the impact of current crisis, determining tighter targets which would require additional budgetary efforts on top of the ones already planned by governments. This could reduce governments' incentives in committing towards too ambitious objectives over the medium term horizon, leading to a reduced political ownership of this rule and eventually undermining fiscal discipline. On the basis of debt and GDP growth projections, the paper also proved that the new MTO methodology would result in more restrictive targets at the moment of their revision scheduled for 2012.

Finally, the introduction of the fiscal and financial exposure indicator in the algorithm for computing MTOs shows that in times of crisis, countries with large domestic and/or external imbalances may be called for to set fiscal targets much more ambitious than those determined on the sole basis of the current debt-to-GDP ratio. Notwithstanding the relevance of these results, our findings should be interpreted with caution because they are still subject to large uncertainty as the exposure indicator is heavily influenced by the variables chosen to perform the ranking of countries, and because the relative position of a country could vary according to the modalities chosen to group the sub-indicators. Given these limitations, the exposure index metric should be considered as a preliminary attempt aimed at introducing in the current policy debate two important issues: the impact of current explicit liabilities on the determinants of fiscal targets; and the role of domestic and external imbalances for the conduct of efficient and credible fiscal policies.

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## COMMENTS ON SESSION 4 THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

*Carlo Cottarelli\**

I was fortunate enough to be asked to comment on three papers with which I have little reasons to disagree. These are very useful papers, and I enjoyed reading them. The downside of this is that I do not have too much to suggest about these papers. So, after commenting on some aspects of these papers, particularly the one on the effect of banking crises on public finances, I will provide some of my views regarding the challenges that countries are facing in terms of exiting the accumulation of public debt related to the crisis.

**Comments on the papers “The Consequences of Banking Crises for Public Debt” by Davide Furceri and Aleksandra Zdzienicka, “Cyclical and Structural Components of Corporate Tax Revenues in Japan” by Junji Ueda, Daisuke Ishikawa and Tadashi Tsutsui and “Structural Aspects of the Japanese Budget” by Michio Saito**

I will start from a comment on Davide’s paper on the consequences of banking crises on public debt.

The paper is convincing in showing that banking crises have major implications for the fiscal accounts and that these implications depend on the specific features of the crises, such as its severity for output loss, the extent of discretionary actions, and, over the medium term, the quality of fiscal institutions. Other factors such as openness, size, degree of developments, are not important. All this is very intuitive, and, if anything, my only complaint is that these results are in a way too intuitive, or pretty obvious. There are some not obvious results, in particular, those relating the cost of the financial crises to the modalities of support – e.g., liquidity support would have a stronger impact than direct recapitalization – but these are the results that the authors themselves regard as to be taken with caution.

However, the paper does not focus on one important aspect, namely the potential interaction between banking crises and the exchange rate. Many banking crises are associated with large swings in exchange rates (for example, the banking crises in Asia in the 1990s, or Turkey in 2001). These exchange rate swings have huge implications for public debt ratios whenever public debt is denominated in foreign exchange. The effect of exchange rate corrections on public debt could be a persistent one if the exchange rate was initially overvalued and, following the crisis, stabilizes at a level closer to that determined by long-term fundamentals. The paper could have taken these factors into account.

Focusing on the recent crisis, what are the implications of the paper for the persistence of the shocks suffered by the fiscal accounts? The key message of Davide’s paper is that the persistence of the shocks depends on their nature. Thus, it is important to look at the reasons why the debt-to-GDP ratio is rising as a result of the current crisis. I will focus on the advanced countries because this is where the major fiscal problems are.

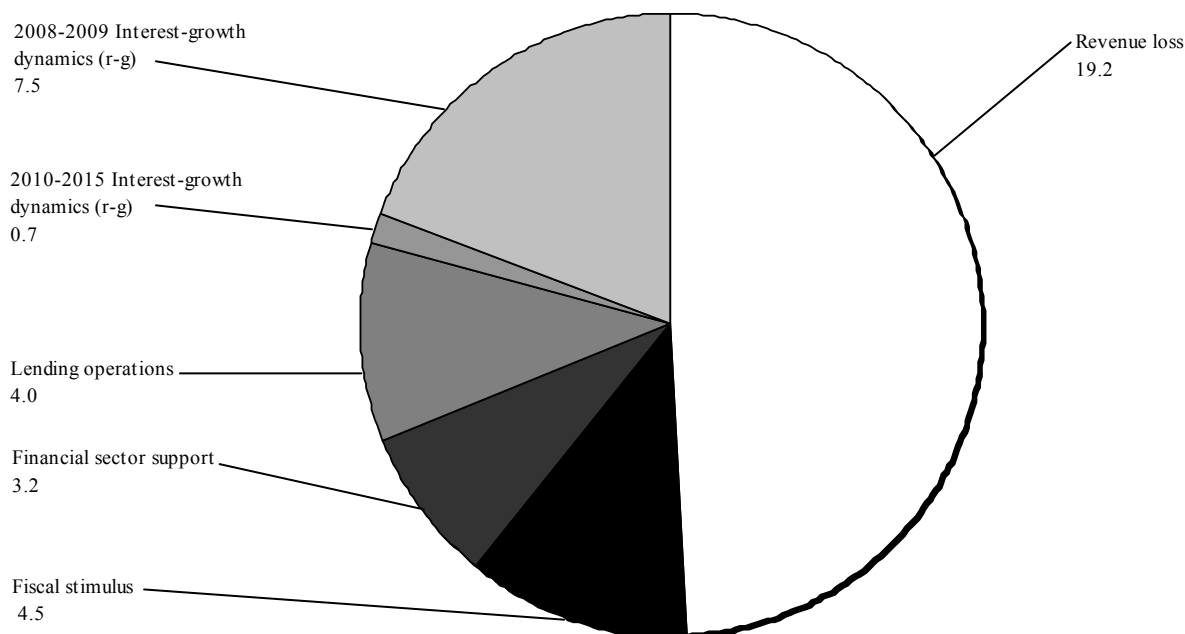
The pie chart in Figure 1 breaks down the increase in general government gross debt in the advanced G-20 countries into its various components. Some of them reflect factors that have temporary effects on the deficit, others that have permanent effects on the deficits. But even those

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\* IMF.

Figure 1

**G-20 Advanced Economies: Increase in Public Debt, 2008-15**  
*(total increase: 39.1 percentage points of GDP; 2009 PPP weighted GDP)*



Source: IMF staff estimates based on the April 2010 WEO.

that have temporary effects on the deficit have a permanent effect on debt ratios. Let us consider these factors one by one.

**Fiscal stimulus:** this includes measures undertaken specifically with the goal of alleviating the crisis. The effect is small and is temporary on the deficit (as most of these measures were temporary or easily reversible), but their effect on the stock of debt is permanent unless not only they are allowed to expire but are offset with a (temporary) fiscal tightening.

The effect of the operations in direct support of the financial sector on the debt could, in part, at least, be temporary: assets have been typically accumulated against these operations, and they could be sold over time. Part of the support, however, will result in permanent losses, whose effect is permanent. In any case, this item is rather small, compared with the overall increase in public debt.

About 10 percent in the overall increase in public debt relates to lending operations introduced during the crisis to alleviate the credit crunch that was affecting some nonfinancial sectors (e.g., lending to students by the U.S. government). If these loans are repaid overtime, and new lending is taken over by the private financial sector as the latter recovers, the effect on gross debt will be temporary.

However, the largest item, explaining about half of the increase, reflects the huge revenue losses arising from the crisis, the loss in output (with respect to the pre-crisis potential, as well as lower payments from the financial sector and higher asset prices, to the extent pre-crisis revenues



from these sources were above equilibrium). With respect to these losses, one important element of uncertainty relates to the extent to which the crisis led to a permanent drop in potential output levels. If it did, the flow loss will not be fully recovered. But in any case the stock loss would not be recovered.

Finally, the increase in the debt ratio is also partly due to the direct effect of the decline in the denominator of the ratio (output), or, more precisely, to the extent to which this drop was not affected by a drop in interest rates (it is the differential between interest rates and growth that drives the output-to-GDP ratio). As we are observing the increase in the debt ratio between 2007 and 2015 – a year by when the output gap is expected to be closed – this effect could be expected to be permanent (as it already reflects the recovery of output arising from the closing of the output gap). However, to the extent that the recovery of potential output is currently underestimated in the fiscal projections underlying the figure, the case could be made that GDP in the period ahead could rise faster than projected, which would lead to a lower increase in the debt ratio (or a decline following 2015). Whether this will happen or not – even assuming that the decline in potential output is indeed overestimated – depends on the reaction of interest rates to the higher output growth. If interest rates are also higher, there will not be any benefit in terms of the dynamics of the debt ratio.

Altogether, we can safely conclude that a large part of the shock to public debt is definitely of a permanent nature and will require policy actions to reverse it.



## COMMENTS ON SESSION 4 THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

*Richard Hemming\**

### **1 Comments on “The New Medium-term Budgetary Objectives and the Problem of Fiscal Sustainability After the Crisis” by Paolo Biraschi, Marco Cacciotti, Davide Iacovoni and Juan Pradelli**

This interesting paper discusses the new methodology that has been developed to determine medium-term objectives (MTOs) for the structural budget balances of EU Member States. The new methodology is supposed to provide the transparent quantitative basis for determining MTOs that is currently lacking. It is therefore rather strange that the algorithm is not available, despite countries having used it to derive MTOs for 2009 Stability and Convergence Programmes. However, this paper contributes to transparency by deriving the algorithm for reported MTOs. A good bit of guesswork is involved, but it is difficult to believe that the authors are way off the mark. Moreover, their conclusions, which are that the new methodology appears to be weak in terms of the speed with which debt ratios are brought back to 60 per cent (the supplemental debt-reduction effort) and the incentive to reduce implicit pension liabilities, are probably robust.

In terms of detail, the explanation of the way the algorithm is derived would benefit from a clear mapping of MTOs that are designed to provide a safety margin, achieve sustainability, and accommodate growth-oriented spending and fiscal stabilization to the specific focus on the maximum MTO implied by the safety margin, the commitment to achieve a structural deficit no larger than 1 percent of GDP, and a combination of the debt stabilizing budget balance, the deviation of the debt ratio from 60 per cent of GDP, and implicit liabilities. This section of the paper is quite heavy going, and could be made easier for the reader.

The paper then proceeds to look at the impact of the recent financial and economic crisis on MTOs. The paper argues – in my view quite correctly – that fiscal stabilization and financial sector support costs have weakened debt positions and increased implicit liabilities in many countries and the fiscal adjustment strategies implied by the tighter MTOs that result could prove counterproductive for economies trying to recover from recession. The calculations of the impact of the crisis on MTOs reveal some large changes in MTOs that could indeed threaten fledgling recoveries if translated into front-loaded fiscal adjustment.

In the final section, the paper proposes an alternative approach to thinking about the required supplementary debt-reduction effort. The idea is that the risk created by particular debt level depends on a variety of factors that vary across countries, and it would be better to focus on some of these factors, and not on deviations from a common target, in deriving the supplementary debt-reduction effort a country should make, and thus its MTO. To this end, the authors construct an exposure index based on characteristics of government debt (level, composition and rollover requirements) as well as other domestic and external imbalances. This is a valuable contribution in an EU context, but the authors could acknowledge similar work that has been done on emerging markets with the specific objective of determining the “debt tolerance” of different countries. The authors should also review their discussion of the country estimates of the exposure index. These are generally as one would expect, but their interpretation, and that of the revised MTOs associated with the exposure index, may need to be modified in light of developments in southern Europe.

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\* Duke University.

## **2 Comments on “Implications of the Crisis for Public Finances: The Case of Austria” by Lukas Reiss and Walpurga Köhler-Töglhofer**

Many countries have suffered larger output losses and sharper deteriorations in their fiscal positions because of the financial crisis than Austria. But the debt will continue to grow in the absence of fiscal adjustment, and the 4 percentage points of GDP adjustment required over the medium term to satisfy the conditions of the EU fiscal framework, cover the rising costs of population aging, and provide room to respond to future crises, while much less than in some other countries, is certainly no small matter.

Against this background, the emphasis that this paper places on growth-oriented adjustment is welcome. If the adjustment measures are of good quality, the more likely it is that adjustment targets will be met without imposing unnecessary economic and social costs.

The authors favor expenditure cuts, which are the source of most successful adjustments, but the paper does not say very much about where the cuts should fall. Rather, the authors place their faith in the new medium-term expenditure framework (MTEF) and budget structure. Not enough detail is provided to compare the MTEF and budget structure with best practice, but if budgets are guided by well-designed strategies and linked to results, then there is a good chance that the quality of budgeting will improve and cuts will reflect a careful prioritization of spending.

The paper is more precise on tax changes, favoring specific tax increases that are “growth-friendly” (*i.e.*, higher property, fuel, alcohol and tobacco taxes). These recommendations are fine as far as they go, although the best thing for growth would be to reduce the high explicit and implicit marginal tax rates on labour. Piecemeal tax increases are not a substitute for comprehensive tax reform, especially over the medium-term.

The remainder of the paper focuses on supporting structural reforms, especially to increase labour supply, which seem appropriate, and the dangers of relying on inflation or bracket creep to reduce debt, which are widely understood. I would have preferred that the paper drop these sections, which do not add much, and instead spell out and justify an adjustment strategy in more detail.

## COMMENTS ON SESSION 4 THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

*Tomasz Jędrzejowicz\**

I would like to begin by thanking Daniele Franco and Banca d'Italia for inviting me to this workshop and giving me an opportunity to discuss two excellent papers: "A Note on Optimal Fiscal Rule for Turkey" by Mehmet Yörükoğlu and "Optimal Fiscal Policy in the Post-crisis World" by Francesco Caprioli, Pietro Rizza and Pietro Tommasino.

As this session is devoted to the legacy of the crisis, let me begin with a few remarks on how the crisis has affected fiscal policies. Over the recent months we have witnessed a massive increase in public deficits, arising from the operation of automatic stabilisers, discretionary fiscal stimulus measures, government support to financial institutions, as well as a reversal of revenue windfalls arising from asset price bubbles. In addition, as potential output estimates have been revised downwards, structural fiscal positions were revealed to have been much worse than estimated before the crisis.

The effect of this widening of fiscal imbalances has been on the one hand prevention of an even deeper recession of uncertain magnitude. On the other hand, however, they have resulted in a huge build-up of public debt, amounting to around 30-40 per cent of GDP. As a result, debt ratios in developed countries are on average projected to exceed 100 per cent of GDP and continue rising. Sizeable structural deficits persist and debt dynamics are turning from a very favourable environment observed in recent years to an adverse mix of slower potential growth and, at least in the medium term, a likely increase in long-term interest rates.

In this environment, it may be useful to ask the question about the optimal or acceptable debt ratio – what should governments aim to do in the current context – simply stop the build-up of public debt or rather reduce it and if so then to what level.

The key consideration in this respect is an "acceptable" debt threshold, found in the empirical literature to be critical in terms of the impact of government policy on the economy. Beyond this threshold, estimated by some studies at around 90-100 per cent of GDP, risk premia may be expected to rise sharply, the behaviour of economic agents may change, as they become more Ricardian and economic growth suffers. These effects are reflected in the Caprioli, Rizza and Tommasino paper.

Other considerations have also been mentioned in the literature for thinking about the optimal or desired level of public debt. One is the idea of using deficit financing to finance only public investment, implying that the optimal level of public debt is a function of the desired stock of public capital.

Another important argument is that of intergenerational equity and demographics in general. The projected increase in old-age dependency ratios and the ensuing increases in ageing-related public expenditure pressures are an important argument for pre-funding, *i.e.* reducing debt ratios or even building up net asset positions today, so as to ease the burden falling on future generations.

The issue of the optimal/acceptable debt ratios is to some extent addressed by both of the papers I shall discuss, as they both address the issue of targeting an optimal or acceptable debt ratio and both do so using theoretical models. However, while the paper by Caprioli, Rizza and Tommasino focuses on the period after or during a crisis, the paper by Yörükoğlu discusses a fiscal

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rule to be employed in “normal” times. In addition, the frameworks of the two papers differ a lot, so I shall discuss them separately.

## **1 Comments on “Optimal Fiscal Policy in the Post-crisis World” by Francesco Caprioli, Pietro Rizza and Pietro Tommasino**

The paper by Caprioli, Rizza and Tommasino describes an infinite horizon economy model, with an infinitely lived representative consumer and a benevolent fiscal authority which issues and services debt and imposes distortionary taxation. In the first stage, consumers are fully confident about government solvency, there is therefore no need to reduce the initial debt ratio. As a result, it is optimal to stabilise debt, keep the tax level smooth and thus facilitate consumption smoothing. In the second step, consumers’ fear of government default is introduced, although it is ungrounded, as the government has no intention of defaulting. In these circumstances, debt reduction becomes an optimal policy, so as to avoid an increase in risk premia.

The lack of possibility of default in the model is not quite intuitive, and the authors mention a possible extension in the form of introducing a strategic default.

However, it is worth considering, whether a forced default would not be more likely to occur in reality. Based on evidence gathered mainly in emerging market economies, sovereign default literature suggests that defaults carry high economic and political costs and that these reputational costs are actually higher if the default is strategic. In addition, the consumers’ perception of default risk in the model depends only on the debt level, while it could be broadened to include other factors, such as political factors, fiscal institutions or size of government. A potential solution to both issues could be the introduction of a fiscal limit *à la* Bi and Leeper (2010) in the form of a dynamic Laffer curve. One could also consider modelling default as a political decision conditional on the fiscal limit.

Let me now move to the policy conclusions of the paper. In the first stage, when there is full trust in government solvency, after a crisis leading to a build-up of public debt, the debt ratio is stabilised at the resulting level, without any debt reduction. This would imply debt ratcheting, with each subsequent crisis or downturn. In the second stage, once consumers begin to fear a default, following a build-up of public debt, the debt ratio needs to be reduced, but the question is to what level. Authors note, that after 20 periods, the debt-to-GDP ratio is equal to about 100 per cent of GDP in the case of a fully credible government, while it is equal to 35 per cent in the other scenario. However, the rationale behind the 35 per cent of GDP debt ratio is not given in the paper. It is also worth considering, whether debt should be reduced to the critical level, beyond which consumers begin fearing default or rather even further, so as to ensure a safety margin when the next crisis hits.

## **2 Comments on “A Note on Optimal Fiscal Rule for Turkey” by Mehmet Yörükoğlu**

Let me now turn to the Mehmet Yörükoğlu paper on the optimal fiscal rule for Turkey. In looking for such a fiscal rule, the paper addresses a dynamic fiscal loss minimization problem, aiming to minimise deviations of both spending and debt from optimal levels. As noted in the paper, as well as in literature dealing with fiscal rules more generally, one of the desirable features of a fiscal rule is simplicity. In this respect, the rule proposed in the paper may be considered simple in a model setting, but not necessarily for politicians to apply and for the general public to monitor compliance.

A key aspect of the paper is the dual objective of the rule, which is to stabilise the spending and debt ratios. The relative importance of the two objectives is denoted by  $\alpha_g$  and  $\alpha_b$ , which are called political preference parameters in the paper. However, the targeted stability of the two ratios will have different macroeconomic implications and as such, their relative importance may be more than simply an issue of political preference. The case for a relatively stable expenditure ratio appears to be strong. Expenditure volatility has been found in empirical studies to be harmful for economic growth. One reason for this may be, that a relatively stable expenditure ratio is a key ingredient for the successful operation of automatic stabilisers on the revenue side. Meanwhile, adjusting the spending ratio to debt fluctuations implies a strongly procyclical fiscal policy. For example, if the debt ratio increases in a downturn, the rule would call for a procyclical cut in public expenditure. In fact, even maintaining a stable ratio of public expenditure to nominal GDP would result in a procyclical policy, with spending rising faster in upturns. An option could be to target a stable ratio of spending to potential GDP, provided that the underlying fiscal position is sound, although using an unobserved variable as a policy target entails another set of problems.

Meanwhile, maintaining a stable debt ratio has different effects. Fluctuations of the debt ratio over the economic cycle are a natural and desirable consequence of the operation of automatic stabilisers, as well as timely discretionary anti-cyclical policy, provided that such is carried out. If a government were to try to minimise these fluctuations, this would again imply a pro-cyclical policy. More generally, changes of the debt ratio by themselves do not have negative effects, provided that fiscal policy remains sustainable. In this respect, keeping debt below the critical debt threshold referred to earlier, is likely more relevant for policymaking than maintaining a stable debt ratio.

The paper could generally reflect more on the cyclical impact of fiscal policy and take this impact into account when discussing the design of an optimal fiscal rule. The author applies the fiscal rule to historical output growth figures, but does not address the issue of the impact of fiscal policy on the growth path. Even if output stabilisation was not to be explicitly featured as a target of the rule, it could be useful to evaluate the rules considered from the viewpoint of the impact of resulting fiscal policy on output.

